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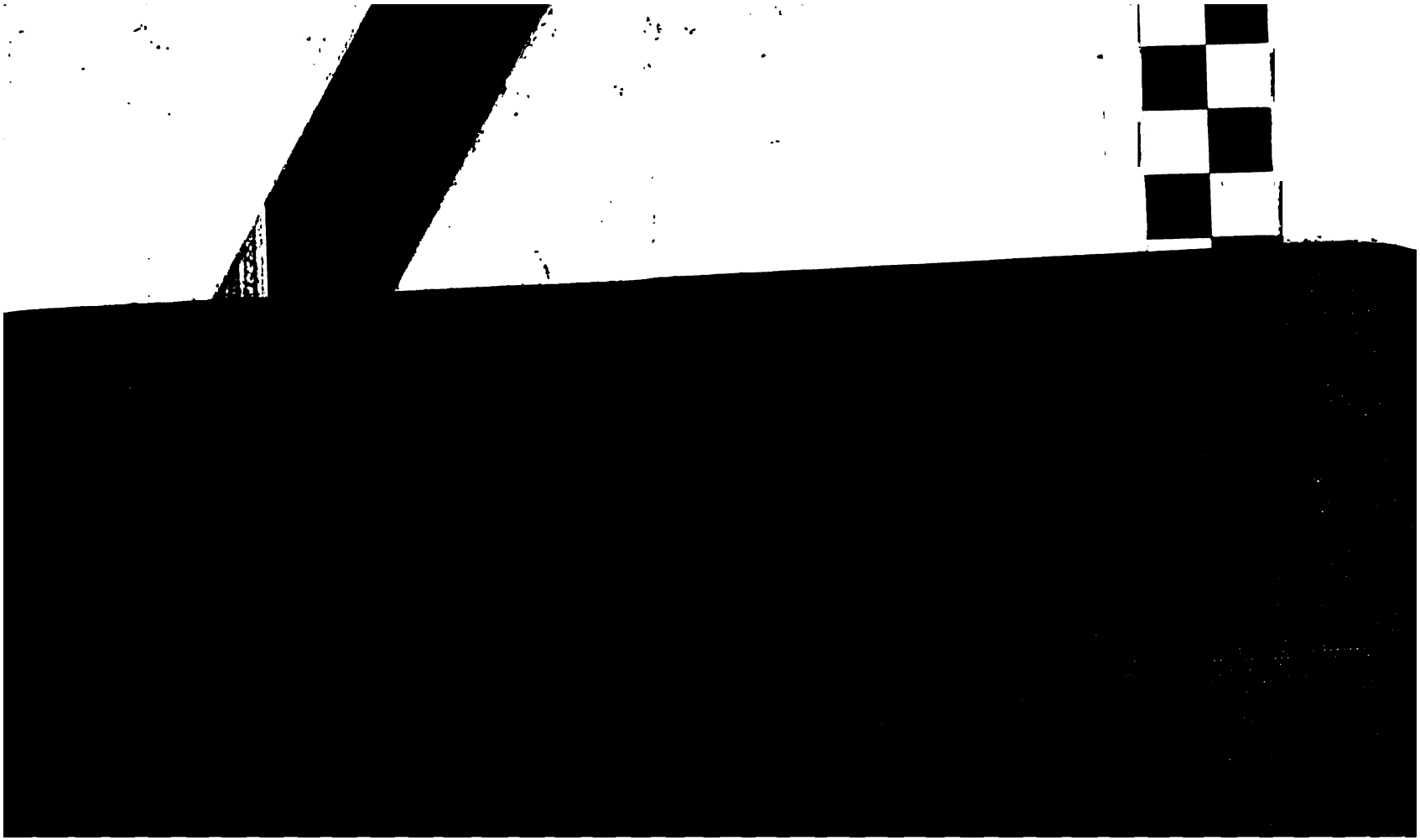

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OF THE

AMERICAN PEDIATRIC SOCIETY

ELEVENTH SESSION

HELD AT DEER PARK, JUNE 27, 28, AND 29, 1899.

WITH THE CONSTITUTION.

EDITED BY

FLOYD M. CRANDALL, M.D.

VOLUME XI.

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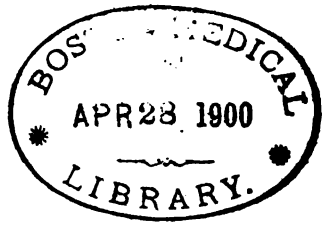

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PRESIDENTS.

1889.	A. Jacobi, M.D.	1895.	F. Forchheimer, M.D.
1890.	J. Lewis Smith, M.D.	1896.	Joseph O'Dwyer, M.D.
1891.	T. M. Rotch, M.D.	1897.	Samuel S. Adams, M.D.
1892.	Wm. Osler, M.D.	1898.	L. Emmett Holt, M.D.
1893.	A. D. Blackader, M.D.	1899.	Wm. P. Northrup, M.D
1894.	John M. Keating, M.D.	1900.	Henry Koplik, M.D.

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B. K. Rachford,	C. P. Putnam,
A. D. Blackader,	F. Forchheimer.

MEETING PLACES.

1888. Washington (Organization), September 18.
1889. Washington and Baltimore, September 20 and 21
1890. New York, June 3 and 4.
1891. Washington, September 22 and 25.
1892. Boston, May 2, 3, and 4.
1893. West Point, May 24, 25, and 26.
1894. Washington, May 29 and June 1.
1895. Virginia Hot Springs, May 27, 28, and 29.
1896. Montreal, May 25, 26, and 27.
1897. Washington, May 4, 5, and 6.
1898. Cincinnati, June 1, 2, and 3.
1899. Deer Park, June 27, 28, and 29.
1900. Washington, May 1, 2, and 3.

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WM. OSLER,	J. C. WILSON.

Delegate to the Congress of American Physicians and Surgeons.
A. JACOBI.

Alternate, - - - - - A. CAILLÉ,

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S. S. ADAMS, F. M. CRANDALL.

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S. S. ADAMS.

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DORNING, JOHN, M.D.,.....252 West Twenty-fifth Street, New York
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LOCKWOOD, WM. F., M.D..... .....8 Eager Street, Baltimore
MARTIN, CHARLES F., M.D.....33 Durocher Street, Montreal
MCCOLLOM, F. H., M.D.....745 Massachusetts Avenue, Boston
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STENGEL, ALFRED, M.D.....1811 Spruce Street, Philadelphia
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WATSON, WM. PERRY, M.D.....319 York Street, Jersey City
WENTWORTH, A. H., M.D.....294 Marlborough Street, Boston
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WILSON, J. C., M.D.....1437 Walnut Street, Philadelphia
WINTERS, J. E., M.D.....25 West Thirty-seventh Street, New York
YALE, LEROY M., M.D.....432 Madison Avenue, New York

Deceased.

JOHN A. JEFFRIES, M.D.
Born, September 2, 1859,
Died, March 26, 1892.

THOMAS F. SHERMAN, M.D.,
Born, March 17, 1856,
Died, September 26, 1893.

JOHN M. KEATING, M.D.,
Born, April 30, 1852,
Died, November 17, 1893.

CHARLES WARRINGTON EARLE, M.D.,
Born, 1845,
Died, November 19, 1893.

J. LEWIS SMITH, M.D.,
Born, October 15, 1827,
Died, June 9, 1897.

JOSEPH O'DWYER, M.D.,
Born, October 12, 1841,
Died, January 7, 1898.

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MINUTES OF THE ELEVENTH ANNUAL MEETING OF THE AMERICAN PEDIATRIC SOCIETY.

Held at Deer Park, Md., June 27, 28, and 29, 1899.

The meeting was called to order by the President, Dr. W. P. Northrup, of New York, at ten o'clock. The minutes of the tenth annual meeting were approved as published in the ARCHIVES OF PEDIATRICS.

The following guests were introduced by the Secretary: Drs. Murdock and West, of Baltimore, and Drs. Deale and Motter, of Washington.

The following members were present: G. N. Acker, M.D., Washington; S. S. Adams, M.D., Washington; A. D. Blackader, M.D., Montreal; H. D. Chapin, M.D., New York; A. C. Cotton, M.D., Chicago; F. M. Crandall, M.D., New York; J. Dorning, M.D., New York; F. Forchheimer, M.D., Cincinnati; R. G. Freeman, M.D., New York; E. E. Graham, M.D., Philadelphia; J. P. C. Griffith, M.D., Philadelphia; C. G. Jennings, M.D., Detroit; H. Koplik, M.D., New York; W. F. Lockwood, M.D., Baltimore; J. D. M. Miller, M.D., Philadelphia; J. L. Morse, M.D., Boston; W. P. Northrup, M.D., New York; F. A. Packard, M.D., Philadelphia; C. P. Putnam, M.D., Boston; B. K. Rachford, M.D., Cincinnati; T. M. Rotch, M.D., Boston; A. H. Wentworth, M.D., Boston; J. P. West, M.D., Bellaire; T. S. Wescott, M.D., Philadelphia.

FIRST SESSION.—JUNE 27.

The annual address of the President, entitled "The Teaching of Pediatrics," was read by Dr. William P. Northrup, of New York.

Discussion by Drs. Rotch, Griffith, Chapin, Blackader, Forchheimer, Adams, Cotton, Crandall, and Northrup.

SECOND SESSION.—JUNE 27.

Dr. G. N. Acker, Washington, presented a case of porencephalus, and presented a photograph of the specimen.

Dr. A. Jacobi, New York, read by title a paper upon "The Children's Service of Roosevelt Hospital."

Dr. H. Koplik, New York, read a paper upon "The Increase of Weight in Artificially Fed Infants."

Discussion by Drs. Griffith, Rotch, Cotton, Adams, Crandall, Morse, Wentworth, Chapin, Blackader, Forchheimer, Northrup, and Koplik.

Dr. R. G. Freeman, New York, read a paper entitled "Separation of Bacteria from Milk by Natural Process."

Discussion by Drs. Cotton, Wentworth, Koplik, Forchheimer, Graham, Rotch, Adams, and Freeman.

Dr. S. S. Adams, Washington, reported a case of "Sarcoma of the Cerebellum in a Child," and presented the specimen.

Discussion by Dr. Wentworth.

Dr. J. P. West, Bellaire, read a paper entitled "Enlarged Lymph Glands as a Symptom of Lymphatism."

Discussion by Drs. Rachford, Chapin, Crandall, Northrup, and West.

Dr. C. W. Townsend, Boston, read by title a paper on "Congenital Heart Disease."

THIRD SESSION.—JUNE 28.

On motion the Secretary was instructed to telegraph to Dr. Francis Huber, of New York, expressing the sincere sympathy of the Society and the wish that he may have a speedy and complete recovery from his illness and recent operation.

Dr. J. P. C. Griffith, Philadelphia, reported a case of "Transposition of the Viscera and of the Great Vessels," and presented photographs.

Discussion by Drs. Chapin, Koplik, Northrup, and Griffith.

Dr. R. G. Freeman, New York, read a paper on "Abnormal Conditions in the Livers of Infants and Children."

Discussion by Drs. Wentworth, Rotch, Freeman, Koplik, and Blackader.

Dr. A. H. Wentworth, Boston, reported a case of "Meningitis Due to the Typhoid Bacillus."

Discussion by Drs. Koplik, Northrup, Freeman, Rotch, and Wentworth.

Dr. A. Caillé, New York, presented by title a paper describing a clinical diagnosis chart and record, a guide to bed-side diagnosis.

Dr. F. Forchheimer, Cincinnati, read a paper entitled "Vaccinoid."

Discussion by Drs. Putnam, Freeman, Dorning, and Forchheimer.

Dr. J. D. M. Miller, Philadelphia, read a paper on "Acute Articular Rheumatism in Infants under One Year, with Report of a Case."

Discussion by Drs. Crandall, Jennings, Koplik, Griffith, Cotton, and Miller.

Dr. H. D. Chapin, New York, read a paper entitled "The Question of Gruels in the Feeding of Infants."

Discussion by Drs. Graham, Morse, Cotton, Miller, Jennings, Blackader, Rotch, Rachford, Wescott, Griffith, Koplik, Crandall, Freeman, Dorning, Forchheimer, and Chapin.

FOURTH SESSION.—JUNE 28.

Dr. F. A. Packard, Philadelphia, read a paper on "Urticaria of the Mucous Membranes."

Discussion by Drs. Blackader, Wentworth, Miller, Dorning, and Packard.

Dr. J. L. Morse, Boston, read a paper entitled "The Renal Complications of the Acute Enteric Diseases of Infancy."

Discussion by Drs. Koplik, Adams, Chapin, Cotton, and Morse.

Dr. H. Koplik, New York, exhibited a new form of binaural stethescope for infants and children.

Discussion by Drs. Wentworth, Morse, and Koplik.

Dr. H. D. Chapin, New York, presented a new tongue depressor designed for infants.

Discussion by Drs. Wentworth, Koplik, Rotch, Blackader, Dorning, Wescott, Putnam, Forchheimer, Griffith, Adams, Crandall, Freeman, and Chapin.

Dr. J. H. Fruitnight, New York, read by title a paper on "Scorbutic Membranous Colitis."

Dr. A. D. Blackader, Montreal, read by title a paper on "Disease of the Thymus as a Cause of Sudden Death in Children."

Dr. L. E. Holt, New York, read by title a paper on the "Necessity of Prolonged Rest and Acute Heart Inflammation in Childhood."

FIFTH SESSION.—JUNE 29.

Dr. F. M. Crandall, New York, reported a case of "Scurvy in an Infant of Six Weeks."

Discussion by Drs. Dorning, Rotch, Graham, Griffith, Koplik, Wentworth, Adams, Northrup, and Crandall.

Dr. H. Koplik, New York, read by title a paper upon "Hemorrhage Following Exploratory Puncture of the Chest for Fluids in Infants and Children."

Dr. T. S. Wescott, Philadelphia, read a paper on "Cerebro-Spinal Symptoms in Epidemic Influenza of Infants."

Discussion by Drs. Wentworth, Chapin, and Wescott.

Dr. E. E. Graham, Philadelphia, read a paper on "Cystic Disease of the Kidneys in Children," and reported a case.

Discussion by Dr. Freeman.

Dr. A. C. Cotton, Chicago, reported three cases:

(*a*) "Extrophy of the Bladder."

(*b*) "Infective Endocarditis with Unusual Heart Lesions."

(*c*) "Anuria."

Discussion by Drs. Dorning, Packard, Northrup, and Cotton.

Dr. T. M. Rotch, Boston, presented specimens showing "Perforation of the Stomach in an Infant Seven Weeks Old."

Dr. Rotch also read a paper on "Multiple Osteomyelitis in an Infant."

EXECUTIVE SESSION.—JUNE 28.

On nomination of the Council the following officers were elected for the ensuing year:

President, . . .	HENRY KOPLIK, M.D., New York.
First Vice-President, .	E. M. BUCKINGHAM, M.D., Boston.
Second Vice-President, .	ROWLAND G. FREEMAN, M.D., New York.
Secretary, . . .	SAMUEL S. ADAMS, M.D., Washington.
Treasurer, . . .	J. PARK WEST, M.D., Bellaire.
Recorder and Editor, .	FLOYD M. CRANDALL, M.D., New York.
Member of Council, .	J. C. WILSON, M.D., Philadelphia.

Committee of Arrangements for the Congress,
SAMUEL S. ADAMS, M.D.

Committee on Constitution,
S. S. ADAMS, F. M. CRANDALL.

Place of Meeting—*Washington, D. C.*

Fee for Ensuing Year—*Five Dollars.*

The Auditing Committee reported the books of the Treasurer correct.

The following were elected to membership: Alfred Stengel, M.D., Philadelphia; Charles F. Martin, M.D., Montreal.

On motion, the thanks of the Society were extended to the Baltimore and Ohio Railroad for courtesies received.

On motion, the thanks of the Society were extended to Dr. Northrup for the manner in which he had entertained the Society.

FLOYD M. CRANDALL, M.D.,
Recorder.

METHODS OF INSTRUCTION IN PEDIATRICS.

THE PRESIDENT'S ADDRESS, DELIVERED AT THE ELEVENTH ANNUAL MEETING OF THE AMERICAN PEDIATRIC SOCIETY.

BY W. P. NORTHRUP, M.D.,

Professor of Pediatrics, University and Bellevue Hospital Medical College,
Attending Physician to the Foundling, Presbyterian, and
Willard Parker Hospitals; Consulting Physician,
New York Infant Asylum,
New York.

GENTLEMEN—The American Pediatric Society is made up largely of teachers of pediatrics, and it would seem that a discussion of methods of instruction may be profitable. Of course there may be many methods, all successful.

There are, each successive year, more subjects and more details for students to acquire, from primary departments to post-graduate. The number of years allowed to accomplish this task has been increased, so that the kindergarten begins earlier in life, and the professional man is ready to enter his work later in life. The great problem always remains, how to enable the student to apprehend and retain these details. There is progress in the art of teaching, a tendency to simplify, to make easy, to illustrate, to demonstrate; a progress in the art of lightening the task of the student.

The most difficult things to learn have been the multiplication-table and *materia medica;* the easiest, geography and obstetrics. The modern teachers assure us that map-drawing makes pleasant and lasting the acquisition of geography. Obstetrics is easily in the fore from the facility for demonstration by pictures and manikins. Persistent reciting in unison, we are told, commits to the ear the keeping of the sevens and the nines. There yet remains the unlightened task of *materia medica.*

A discussion of the methods of teaching the subjects of especial interest to us may be worth our time. My particular wish is to learn the methods employed by each here present, to

resolve this morning's session into a normal college of teachers of pediatrics.

When I was a student the professor of general medicine lectured on chicken-pox and measles, the professor of pediatrics held once a week a clinic on such cases as presented themselves in the out-patient department. This condition in the College of Physicians and Surgeons existed in 1880. Since that time the subject of pediatrics has grown, its position in all schools has been advanced, and to-day it occupies a sufficiently prominent place in most colleges. Our illustrious colleague, Dr. Jacobi, was the pioneer in pediatric teaching and has helped us to all that which we later teachers enjoy.

What place should the subject *pediatrics* have in the curriculum?

In an undergraduate course, what number of lectures and what amount of time should be given to the subject of pediatrics?

In answering these questions I have drawn upon my own experience in the last year. Have sufficient time and facilities been given the pediatric department to satisfactorily cover the ground, and how do the facilities of the pediatric department compare with other special departments? In other words, what is the recognized grade of pediatrics among the specialties at this medical college?

This point is of interest, for I know that not all medical schools have been equally just or generous in their recognition of pediatrics.

The divisions of medical teaching are: General medicine, general surgery, obstetrics, pediatrics, ophthalmology, orthopedics, neurology, laryngology, otology, gynecology, mental diseases, dermatology, genito-urinary diseases, electro-therapeutics.

The principles and practice of medicine and surgery constitute a very large number of subjects, and are assigned four lectures and two recitations a week, besides clinics and section teaching. Obstetrics, three lectures a week, recitations, clinics, and section teaching. Gynecology, one lecture a week, with clinics and section teaching. Pediatrics, one lecture, one clinic, section teaching. Therapeutics, one lecture a week, one recitation a week. Orthopedics, one lecture a week and one recitation a week. Genito-urinary disease, one lecture a week.

Nervous diseases, once a week, section teaching. Mental diseases, once a week, half a year. Otology, once a week, half a year, section teaching. Dermatology, once a week, section teaching.

It appears from this showing that pediatrics shares with gynecology the fourth place in importance in the whole scheme of instruction, general medicine, general surgery, and obstetrics taking precedence; or, if we attend to special subjects strictly, it shares with gynecology the second place. Obstetrics may well be allowed first place as it has always been; after pediatrics come neurology, laryngology, genito-urinary diseases, mental diseases, otology, dermatology. Pediatrics also requires compulsory attendance in third and fourth years and is a subject for final examination. The professor of pediatrics is not a member of the governing faculty. He and his chief of clinic receive salaries.

While associated with the late Prof. J. Lewis Smith, I was assigned the subject of the exanthemata and acute infectious diseases—didactic lectures only—from the beginning of the year, once a week, up to Christmas. In thirteen lectures I covered the subjects: Measles, German measles, scarlet fever, small-pox, chicken-pox, vaccinia, diphtheria, mumps, whooping-cough, cerebro-spinal meningitis (its pediatric features), tuberculosis of the glands.

Though this averages nearly a subject to a lecture, it is obvious that many of the subjects would not require an hour. German measles would, for instance, need but a few words after a full discussion of measles. The number of lectures was limited, but the lecturer was to cover as many subjects as he reasonably could, and no more, leaving the others to the professor of general medicine. Small-pox was brought in because of its differential relations to chicken-pox.

Here, then, in thirteen lectures was taken a large portion of the acute infectious diseases of children. Thirteen lectures were sufficient for presenting the subject didactically.

The course of instruction at present includes: Didactic lectures; clinics—full class; clinics—sections of class; section teaching in out-door department. This course is carried out in the general lecture room, in the out-patient department, at the Willard Parker Hospital, and at the New York Foundling Hospital.

DIDACTIC INSTRUCTION.

There is a wave of sentiment against didactic teaching. No doubt the reaction against the former complete dissertations on disease is justified. These are days of improved text-books. The didactic lecturer has yet a function. It is this: To present to the beginner the salient points of a subject, to emphasize the few points on diagnosis, symptoms, course, and treatment, which are uppermost in the mind of a man experienced in observing and teaching. As Prof. Dalton once said, students occasionally mention all the muscles of respiration, not forgetting the accessories in the neck used in utmost effort of inspiration, and omit to make any mention of the diaphragm. An average mature student would emerge from studying an expansive treatise on pneumonia, for instance, with an ill-assorted mass of details, most of which would drop out of memory in actual experience with the disease. To use an every-day expression, essentials "on which one travels" are few in meningitis, pneumonia, etc. It is these essentials which it is the function of a lecturer to point out and emphasize before the beginner.

I am going to maintain strenuously that in teaching undergraduates, didactic lecturing is important, and is not to be superceded; it may be modified.

Judging from Niemeyer's book on general medicine, I should estimate him to have been an ideal lecturer. I commend his way of setting forth the essentials of diseases.

The pediatric course comprises all the instruction provided by the curriculum upon the following subjects: Diphtheria, measles, rubella, scarlet fever, chicken-pox, small-pox, vaccina, mumps, whooping-cough, rickets, scurvy.

Features peculiar to children are taught in the following (though these are included in lectures on adults): Cerebro-spinal meningitis, tuberculosis in children, tuberculous meningitis. These subjects are taught both by didactic and clinical instruction.

The diseases which really require both didactic and clinical instruction, which, in fact, no amount of didactic teaching alone could inculcate, are: Measles, scarlet fever, small-pox, chicken-pox.

My effort is to have the student know these well enough to make a diagnosis upon them. He can say of a multitude of

eruptions that they at least are not of the exanthemata. Smallpox is important to students for the same reason.

The following subjects are taught clinically: Diseases of the mouth, pharynx, and larynx; diseases of the stomach, intestines, bronchi, and lungs; empyema and pleurisy, purpura.

Clinically the following subjects belong to the pediatric instructor: Heart anomalies (congenital), cretinism, vaginitis, hydrocephalus, chorea, convulsions, tetany, worms, parasites.

CLINICAL INSTRUCTION.

Clinical instruction needs little discussion. It needs no apology and no emphasizing. It cannot take any place in our present college instruction which will render didactic lecturing unnecessary. It is impossible to pursue a systematic course suitable to undergraduates, a purely clinical course, and have illustrative cases at hand when needed. More of this later.

First of all, the hour of a children's clinic must be as near as possible to the noon hour. After the father's dinner has been set, the mother can find time to take the child to the dispensary. Two o'clock is the hour at our service. Cases collected from twelve o'clock can be induced to remain until two o'clock to "see the professor." It would be even better if one o'clock could be the hour, but it is too early for the students.

The lecture room should be directly connected with out-patient rooms, with dressing-rooms convenient and comfortable. It often happens—so often that it has made its impression—that the best cases come in at the very last moment, before or even after the lecture has begun. In our new building the lecture room is directly over the out-patient department; dressing-rooms are provided, and abundant space at the side of the "pit," where the collected patients can wait. Mothers will wait patiently if they are witnesses to the clinical lecture, see what is transpiring, see that they are courteously treated, and that they are getting special attention. Prof. J. Lewis Smith adopted this method of holding his clientele. Before he adopted it he often found, when he wished to have one of the new patients ushered in, that every soul of them had decamped. The children are less frightened if they enter in groups, and have opportunity to become gradually accustomed to the presence of a large audience. Besides, every teacher is familiar with that pre-entrance murmur of restless students.

This is less apt to frighten patients if they have company of their own kind.

Our practice is to lay out a plan for systematic lectures—the exanthemata, for illustration—pursue it when practicable, but interrupt the lecture at any time, or any number of times, to show a desirable case. A typical case of any disease not previously fully illustrated takes precedence of any subject in hand. If, for instance, the subject of lecture were measles, and an assistant should whisper that a case of scurvy had come in, measles would be quickly set aside, and the case demonstrated. This would be true of nearly any typical case.

The Tuesday two o'clock all-the-year lecture at the college is didactic and clinical in the ways suggested above. All the graduating class is present during the last year, the audience varying from 200 to more. The methods at that hour are of necessity adapted to a large audience, numbers making it impossible to show a case to each individual.

The O'Dwyer Memorial Clinic has been instituted, in connection with the college department, during the last year at the New York Foundling Hospital. This is purely a clinical lecture, with accommodations for 100 men, sufficiently near the wards, so that children sick with acute pneumonia can be brought to it and laid on the elevated bed. Here with little or no disturbance the case can be inspected and the findings given. It is peculiarly a clinic of acute diseases. Empyema have been here operated on; lumbar puncture, gavage, and lavage performed. Of all the features of teaching, this clinic has been to me the most satisfying. The cases have been followed in their history; they are bed cases, are clean and tractable.

SECTION TEACHING.

Section teaching is an important supplement. It means physical examinations, actual contact of the student with cases under competent assistants. Sections are taught in the wards of the Foundling Hospital and in the out-door department. In such matters as bowel and stomach-washing, gavage, lumbar puncture, it is necessary that the number should be limited, and for the student to get very near the patient, and desirable that each student should be able to repeat the demonstration. The section rooms of the out-door department are so placed side by side that the pediatric room is adjacent to the surgical, large,

sliding doors separating the two rooms; and the pediatric and surgical classes meet at different hours. The pediatric room has a small ante-room in which patients who are soon to be examined prepare for examination. So a new patient first enters the general waiting-room, is registered, if assigned to the pediatric room, waits upon the benches before the door. Certain ones are taken into the ante-room, thence into the main room, and if further examination is desirable, upon a table, for instance, or if students are present, they can there be carefully examined. The light is good, there are tables, running water, and, when ready to depart, the patient can make an exit into the main waiting-room without passing through other rooms in which further examinations are going on.

I am much interested in some proposed changes in the Johns Hopkins out-door department, in which general medical work of adults is to be carried on. It consists, practically, in a doubling of the rooms we have just mentioned, since males and females must have separate dressing rooms. The general plan is much the same. For pediatric work it seems to me an ante-room, a main room for histories and general examination, and a clinic room serve very well. It is desirable to have it so arranged that patients can progress from room to room without retracing their steps. They make confusion. One mother disturbs another, one baby another, and, as you all remember, they are sure to forget some article, and burst in upon an examination to recover it.

APPARATUS EMPLOYED IN TEACHING.

I regard the stereopticon as a notable aid to teaching. The eruptive diseases, small-pox, chicken-pox, vaccinia erythema, associated with vaccinia and antitoxin, have been shown in the large lecture room with great satisfaction. A picture in a book can be reproduced on a lantern slide and shown as well five feet in diameter as in the pages of a book. It is easy to secure pictures of small-pox, for instance, covering every day's progress from first to twelfth day of eruption. These can be examined by 250 students as the lecturer points to the different characteristics in the only safe way, and it proves satisfactory. Futhermore, the sections themselves of ricket bones, the cartilage stained blue and bone red, can be placed before the lantern and give an excellent picture of the lesion. I have one such specimen

which I esteem much more valuable in illustration than any other I have seen. Only a large colored photograph could hope to approach it; no fresh specimen or ordinary photograph would. I am of the opinion that there is no way to focus the eyes and attention of many students upon one point so satisfactorily as by stereopticon illustrations. Large sections of lungs, pneumonic and tuberculous, sections of scurvy bones, full-length photographs showing deformities, are well illustrated in the same way.

I have a typical cretin which I show every year; it is most excellent for illustration. My plan is, however, later on, to have a series of lantern slides made, illustrating different features of the disease, to show many cretins at the same time. Such a series can be gone through with fifteen minutes before showing the one case, and the whole subject will be set forth in brief and in a way to be easily apprehended and remembered by most students. This is one of the subjects in which few words beyond the points for diagnosis are profitable for an undergraduate. I hope next year in the new building to be able to promptly darken the room and use the lantern for ten minutes in the midst of the lecture, whenever I wish to illustrate by pictures. Passing pictures about a large class is not satisfactory. By the time pictures have gone to three or four men the discussion of the subject has advanced and the students, always bent on securing notes, are writing industriously.

Fresh pathological specimens. The old-fashioned method of producing material, fresh, red and dripping, has a limitation. Fresh lung specimens are good to fix in the student's mind just how the viscera look when first removed, but many times do not give a very satisfactory view of the lesion. Take for instance a tuberculosis of the lung with pneumonic consolidation and tuberculous bronchial lymph nodes. Such a lung can be made to show the lesion infinitely better by washing away some of the blood and filling the bronchi with a weak preservative—alcohol or formalin. Then appear the tubercles, the dark masses of pneumonia, the cheesy masses, well differentiated. A little care in washing, stretching and mounting intestines, in sawing and preserving bones, in washing and preserving in weak fluids lungs, liver, kidneys, and brains, make them show the lesions to advantage.

A little attention, in short, to the advanced methods of

preservation and exhibition used in pathological museums, in pathological society presentations, will make clear what is here meant.

There yet remains one feature of teaching which, in a further development of a four years' course, is desirable. It presumes more time than now is at our disposal. Recitations remain to be added. Systematic quizzing by an assistant is really needed. I have been pleased to find in my own experience that questioning a class upon the current lecture topics is quite popular with the students.

It is the wish of the writer that this setting forth of the methods of teaching employed in one medical school may call out those employed in others; one might rather say the methods allowed by one medical school as compared with others. Very few here can say that the policy of the individual school in which they teach is all that they could wish. Some college faculties give to pediatrics all the importance that the teacher could reasonably claim, others are not liberal. This subject is brought up at this time and place in the hope that there may be in some degree started an improved degree of liberality.

I for one would be very much interested to learn the methods employed by different teachers. We would all be interested to learn what status each teacher has been able to secure from his college management; in what way they can reasonably expect to improve it; and, finally, what they would regard as ideal methods.

57 EAST SEVENTY-NINTH STREET.

DISCUSSION.

DR. ROTCH.—I will simply state what has been done in the way of teaching pediatrics at Harvard University. The same condition existed there in its early history as did in New York: that is, very little time was given to this subject. The time has gradually been increased and the importance of the subject has been more fully recognized, until it now holds the same position as any of the other branches of clinical medicine or surgery, although it does not require the same amount of time. There is continuous teaching from October to June, that is, for eight months; five exercises a week are given during this time. The examination is compulsory, and lasts for two hours. The

teaching is divided into didactic lectures, clinical instruction, and what we call clinical conferences.

The main part of the time is given to clinical instruction, and it is so arranged that the ward material can be used in connection with that of the out-patient department. The lecture room is in the hospital itself. The Children's Hospital is devoted to individuals over two years of age, and the Infants' Hospital to children under two years. The proportion of didactic lectures and recitations to clinical exercises is as follows: There are 160 exercises from October to June, and of these twenty-four are didactic lectures, twenty recitations, and four clinical conferences.

The conferences are few in number, but the men are incited to do well, and as a reward are given the prominence of having a case to investigate, write up, and read before the rest of the class. Their work counts toward their examination at the end of the year. The students are encouraged to discuss the paper.

At the beginning of the course the time is devoted to teaching the students what is especially distinctive of the early years of life; and having been well grounded, first in what a healthy child should be, they are then taught about the diseases. Especial attention is given to the contagious diseases. We have in the Boston City Hospital a department for receiving all the contagious diseases, and the students are there taught directly under an instructor, who is one of the instructors in the pediatric department. The students are thus brought in direct contact with these diseases.

We also have opportunities to use the lantern and slides, and this method is becoming more and more valuable. By having our lectures in the hospital, we also have the opportunity to show anatomical specimens.

The clinical conference consists of the whole class, I being the presiding officer, and all the instructors and men supplying material to the hospital are invited to be present. We pick out four or five men who are given cases in the wards to study and write up. After the paper has been read, the subject is opened for discussion, first by the students, and, after they have finished, the whole corps of instructors enters into the discussion, and not only discuss it with the students but with each other.

The recitations are also well arranged; for instance, I give my didactic lectures in the beginning of the year—October, November, and December; and in January Dr. Wentworth takes up the subjects I have been lecturing on and illustrates them with the clinical work. Finally, the month of May is devoted again to the review of the whole subject, with a quiz course to prepare the men for their examinations. All the instruction in this subject at Harvard is given during the third year, as we do not consider pediatrics as one of the special branches, but as a part of general medicine.

DR. CRANDALL.—What subjects constitute the didactic course?

DR. ROTCH.—The whole ground is pretty well covered. We first tell the students what they shall see in the healthy child, and then as far as we can cover all the diseased conditions. We have only twenty-four purely didactic lectures, while we have 112 clinics.

At Harvard, by a long process of pushing and fighting for it, pediatrics is now recognized as one of the important branches, and the professor of pediatrics holds a chair in the faculty on an equality with any other member of the faculty, and receives a salary also.

DR. GRIFFITH.—I wish I could say such encouraging things as Dr. Rotch has said. Harvard has always been noted for its progressiveness and Philadelphia for its conservatism. While the latter is a good thing, it may be pushed too far. The time given to pediatrics in the University of Pennsylvania is not so deficient as you might infer from this statement, but I know it is not as great as at Harvard, nor as great as the subject deserves.

When I graduated in 1881, there was no professor of pediatrics; there was, I think, a lecturer in the spring course which existed at that time, and any one might attend who wanted to. The professor of obstetrics gave a few, two or three, lectures on the diseases of children. I think I heard him give one lecture on whooping-cough, and he had two children present supposed to have the disease, but who could not be induced to whoop.

Finally a clinical professorship was established and that has been slowly increasing in importance. When I was first appointed to the position some years ago I had an hour a week assigned me to lecture, but attendance was not compulsory and the class could come or not as it pleased. There was no required examination, except in so far that I had certain questions to submit to the professor of medicine and they were put into his written examination. That of course made the students wish to attend the lectures. A few years ago they started the plan of making certain studies elective and placed pediatrics among those. The men are required to choose certain electives, their choice being entirely free, and I am very glad to say that I think most students realize thoroughly the importance to them of diseases of children, as my number of elective students has always been large. These elective students receive regular, systematic, ward-class work, which I give at the Children's Hospital, because I have better opportunities there. I use almost altogether there the bed service, but make use of the out-patient department when I please. We have a little clinic room where I take the students in sections and I devote three days a week to this throughout the whole term. The whole class is privileged to attend the clinics and I notice the faces of many men at the lec-

tures who are not elective students. In fact, I will do them the justice to say that the attendance upon the clinics is excellent and most encouraging. The entire class comes in sections to the pediatric work in the University Hospital but this is so infrequent for each man that I do not consider it of any special value.

The lectures are either clinical or didactic, as I please, and I follow very much the plan you described yourself. I take up a definite scheme, with certain selected topics, but interrupt this at any moment, depending upon the cases that may present themselves. In the ward-class it is purely bedside work, and I make it a point to have the students examine the cases for themselves, and to ask questions of them and have them question me. I try to make it as informal as possible and try to make the men think for themselves as much as possible, placing them in the position of young physicians dealing with their first cases.

I hope the time will come when matters will be changed at the University of Pennsylvania, when pediatrics will be recognized as a full department and be compulsory for all students. I think, however, we are getting it on a constantly firmer and better established basis.

DR. CHAPIN.—Any discussion of post-graduate instruction must begin with a consideration of undergraduate work. I was for five years engaged in teaching pediatrics at the Woman's Medical College of the New York Infirmary, and at that time the scope of instruction was on a better foundation there than in any institution of the kind in the country. For the last fifteen years I have been teaching post-graduate students, and every year instruct over five hundred of these men from all parts of the country. I would like to say most emphatically that in my opinion the instruction is most inadequate in most of the colleges of the country. The trouble seems to lie with the college authorities, who have not properly appreciated the importance of the teaching of pediatrics. Two or three years ago this was brought to my mind in a startling way. I was on a hospital examining board, when forty physicians came up to be examined for three or four vacancies. I took down the names of the colleges that these men came from, and every important university in the country was represented—Harvard, Yale, McGill, Physicians and Surgeons of New York, Bellevue, University of Virginia, University of Pennsylvania, and several western universities. These men were about the best output of these colleges, and there was not a single one of them that had any proper conception of the diseases of children; not a single one could give correctly the physical signs of fluid in the chest of a baby.

I am very glad to hear about the improvements that are taking place in undergraduate instruction; but all I can say is that so far they have not borne much fruit, and it will probably

take a number of years before they do. I want to emphasize the importance of teaching them theory before they go into clinical studies, for I find that the majority of them are not well grounded. They do not know the difference between disease as it occurs in infants and adults; they have not been instructed in the normal physiology of infancy and the different manifestations of disease at that age. Until they do have such instruction the improved clinical work is not of much value.

The whole point hinges upon the conception of college authorities as to the importance of pediatrics and its proper place in the curriculum. It has frequently been tacked on to obstetrics, and my opinion is that the true importance of pediatrics will not be recognized until it gets into its proper place, and that is as a *branch of general medicine.* The diseases of early life are the same diseases we have later on, but they have a different pathology, a different symptomatology, and require a different treatment; and, instead of treating this subject as a specialty, it should be considered as a branch of general medicine, and a good part of the time devoted to the teaching of general medicine should be given to a consideration of disease as it appears in early life.

The majority of physicians when they leave college are going to take part in the general practice of medicine, and a large part of their work will deal with the diseases of children. As at present taught, they are unable to properly cope with their work. I do not believe this branch of medicine has secured a sufficiently important place in the curriculum. It seems to be in the same grade with the diseases of the throat or ophthalmology in most of the colleges; and in one, we have just heard, it is an elective study. A man is preparing to go out and practice medicine, and the branch of most importance to him is made an elective study—a sad commentary on the management of the college, I think.

Now as to post-graduate work. As I meet these men I find them poor in diagnosis—very poor—and their treatment is rather apt to be heroic. I find that they wish to see a great many cases, and they do not wish for instruction in the theory of medicine at all, for they think they know it. In a post-graduate institution there is no compulsion to attend, and a man must cater to his audience. I find that they all want to know about the subject of infant feeding, and they do not want to hear a long dissertation upon any case.

In closing, I hope the American Pediatric Society will go on record as insisting upon a more adequate teaching of pediatrics in our colleges.

DR. BLACKADER.—I have had much pleasure in listening to Dr. Northrup's paper on the teaching of pediatrics. I agree with the position Dr. Chapin has taken in his remarks: that

pediatrics is not a specialty in the same degree as gynecology or laryngology, but is to be regarded rather as a department of general medicine. This is the position which it holds with us in McGill University. In connection with the course in general medicine, a series of didactic lectures is given to students in the fourth year on the diseases of infancy and childhood. In this special course an effort is made to describe to the student not merely the diseases special to infancy and childhood, but to point out to him how in diseases common to both infancy and adult age the symptoms met with in infancy differ from the symptoms recognized as typical in adult age. Clinical demonstrations on the examination of sick children are given to some extent in the children's wards of our hospitals, but chiefly in the out-patient rooms, where there is a distinct children's clinic. At this out-patient clinic, the fourth year students are taken in groups of four or six twice a week during the entire session.

DR. FORCHHEIMER.—It is not fair to judge undergraduate teaching by the men that attend post-graduate clinics. It is not probable that the best men go there. If we should judge the teaching of the post-graduate courses by the men we see coming back from there, our judgment of them would not at all be favorable.

You have heard from the representatives of some of our large universities and I should like to tell you something about a college that has been run without an endowment for at least forty years and of the methods we have employed in the teaching of pediatrics. I believe firmly that pediatrics is a department of internal medicine and should always be that and not a specialty. Twenty-four years ago, when some of us came home from Europe together, we were very enthusiastic about teaching and I was soon after appointed to lecture upon the diseases of children and continued until I found something better to do; for three years devoting to this subject two hours a day throughout the course. Gradually the matter shaped itself more definitely and I was reduced to two clinical lectures a week, but during the last four years the chair of diseases of children has assumed different proportions and they have now given me thirty didactic lectures, one clinical lecture a week for half the course, and, in addition to this, the out-door service, retaining the small lecture room service that we learned to know of in Vienna. I think we have thus obtained very good results.

DR. CHAPIN.—I want to point out an essential distinction between post-graduate and undergraduate students. The first come as they please, pass around from one teacher to another and are responsible to no one. The undergraduate student is responsible to his teachers or to the college which says what he must do in order to secure his degree. So I waive responsibility

for post-graduate students and in turn hold the colleges responsible for the undergraduate.

DR. ROTCH.—Our object in teaching students is not to drive them into a specialty, but to teach them to take care of children. It is a grave question whether a man is not a better practitioner among children if he also works among adults, but that has nothing whatever to do with the teaching of students. We will never have the proper teaching of any branch unless we have a man devoted to that teaching, and I do not think it is wise to merge the teaching of diseases of children with the teaching of general medicine. Not that they may not come together in practice, but they should be *taught* by different men, because no one has the time to properly teach two branches. I do not mean that it is to be thought of as a specialty, but an individual will do better work if he devotes his time to the teaching of a special subject. As to the question of finding something better to do than teaching pediatrics, I think we should oppose that in every way. If a branch of medicine is worth practicing, or worth considering at all, it is worth teaching. What I have done at Harvard is to try to lay out a proper course of teaching. I think that probably a great many of our graduates have been found wanting when they have appeared at post-graduate schools and I think a great deal of that has to do with the teacher.

DR. FORCHHEIMER.—I spoke of something better to do, because so far as I am individually concerned I would rather teach other things than diseases of children alone, and it must be remembered that the colleges in different parts of the country are differently constituted. The three fundamental branches are medicine, surgery, and obstetrics; and when I said they gave me something better than the diseases of children alone, I thought they did, because the subject was more important.

DR. ROTCH.—We are discussing the best methods of teaching. Where a man's heart is, there will his best work be done. I do not believe a man can teach two subjects, and do them equal justice.

DR. ADAMS.—I am impressed with the belief that the matter does not rest so much with the colleges as with the men themselves. We have it in our own hands to control this matter; but the trouble is, so many men fall over one another to get hospital and college appointments, and after securing them from boards of laymen, submit to the greatest indignities, that the authorities have no difficulty in filling vacancies.

I had satisfaction in holding the second full professorship of pediatrics in the United States. Shortly after I graduated from Georgetown University I was given a lectureship there, and remained for two years. I continued teaching there until

1884, when I resigned, and with six other men organized the medical department of the National University. We made it a day-school, and for the first two years I lectured to one man. At the end of that time we found it impracticable to continue the day-school, and it was converted into a night-school. After eight years' teaching there, Columbian University elected me to a clinical professorship in pediatrics, and Dr. Acker was elected a clinical professor at the same time. We lectured in that school for two years, when we found that the faculty was paying a salary to the men who were lecturing on minor subjects, and the clinical professors were not getting a cent. I started a strike, and Dr. Acker and myself, with several others, controlling a very large part of the clinical material of several hospitals, joined forces.

We consented to remain on two conditions: That we have a voice in the graduation of men, and that we were paid for our work. While they were considering the matter, Georgetown University offered me a full professorship on an equality with the other members of the faculty and a full share of the receipts. I took the matter under consideration, and during that time the Columbian representatives returned an answer that they considered we were right, and that they had decided to pay us five dollars per clinic. Five dollars for two hours' work was not my price. They held a meeting, to which they invited Dr. Acker and others, and I believe they finally agreed to pay them and make their positions more liberal.

So far as my personal method of teaching is concerned, I have pursued a course that has been very gratifying in the way the men seem to be equipped. I have the third and fourth year men, and I have two physicians associated with me as clinical instructors. The fourth year men are divided into sections, and my first assistant takes a division of these men with a patient from the ward and allows them to make a thorough examination and diagnosis. In the meantime, a third and fourth year man are assigned to some case in the ward. The third year man takes notes, while the fourth year man makes an examination and asks questions of the instructor. At the end of the hour, these men with the nurse and myself take the case before the class. The fourth year man goes to the board, writes out the history, diagnosis, etc., and I ply him with questions, making him explain everything of the physiology and pathology connected with the case; and if he fails, I call on other members of the class. Last year each man had the opportunity of examining in this way five different patients with different diseases. If any interesting case comes in which I do not think will keep over for the next week, I bring it before the class and explain it. In regard to hydrotherapy, etc., I make the men as far as possible do the practical work.

The third year men are given to the second assistant, who drills them in the preliminaries of medicine, with particular refer-

ence to the diseases of children. This is as near a practical method of teaching as I can think of, and I have often been surprised at the diagnosticating that some of these men can do.

DR. COTTON.—I believe that personal equation has a great deal more to do with this than anything else. The majority have stood at the door humbly knocking and presenting their wares until the authorities, the governing boards, have opened the door and invited them in. It seems to have been difficult everywhere to convince the faculties of the importance of teaching pediatrics. I believe it should not be insisted upon as a specialty, but that it is a branch of the department of medicine and that it should be presented by a man whose heart and soul are in it.

Since this is an experience meeting and the president requests us to relate the status of pediatrics in our different localities, I would state that so far as Rush College is concerned, when I graduated there in 1878 Prof. Miller was recognized as the professor of obstetrics and diseases of women and children, and I do not remember that in the two courses of lectures I heard he mentioned children, except once when he exhibited a case of gastro-enteritis. In 1880 Prof. Knox was given the chair of diseases of children and I was invited to be his assistant. About 1885 an examination was allowed to the department of diseases of children and it counted some small fraction in the grand total of requirements for graduation. The senior class was divided into sections of ten for dispensary teaching and an amphitheatre clinic was given once a week. A certificate was given by the dispensary physician to show that the student had attended at least 75 per cent. of the clinics.

In 1893 Prof. Knox died and I was made clinical professor of medicine. In 1894 a separate chair for pediatrics was started and time was allowed for thirty didactic lectures and a clinic once a week. The students took notes at the clinics and as a part of their examination were required to present the history of a case seen in the clinic.

In July of this year we start on a new schedule and for the first time I have succeeded in securing a junior course which I consider very important. I have laid out a course including anatomy, physiology, and hygiene of infancy and childhood with all that that means. Two instructors will drill the students, assigning each a lesson upon which they will be quizzed upon a later day. They must pass an examination before they can enter the senior class. The clinics will be optional to the juniors but compulsory for the seniors. In the clinical amphitheatre the senior course is given by an advisory staff. Four students being called upon in alphabetical order, they retire to an adjoining room, where one is given absolute control of the patients to decide what cases are proper to send into the clinic, etc. It is

his day and the other three are subordinate to him. He assigns the other students to other cases, to write up their histories and present them later in the amphitheatre where the consulting staff is prepared to hold the clinic. I have been told by many of the students that this method is beneficial, in that it stimulates them to their best efforts.

The conference course has been a good thing for us, I think. I ask for all students who are willing to take an out-patient case and study it thoroughly to send in their names. From this list one is called from time to time as the cases present themselves. He follows up the case, and if a fatal result comes he has a *post-mortem* made. He is encouraged in every way to work the case up and he announces when he is ready to present the history of the case at conference. This is valuable, I believe, because it gives the student a little foretaste of what he must do when he gets into practice.

In regard to the relationship of the professor of pediatrics, when I was called to this chair, I dropped the position of professor of *materia medica* and soon realized that there was a string to my new position. I was not invited to the faculty meetings to discuss important matters. I found that I was a member of the faculty, but not of the executive faculty. I think the best place for pediatrics is a connection with the chair on the practice of medicine. If the teacher of pediatrics cannot convince the students of the importance of that branch it ought to drop behind. When we were arranging the curriculum this year we adopted the university plan of making as many branches as possible elective, and we now have practically all but the four primaries elective, and I am willing to take my chances of the students choosing pediatrics.

DR. ROTCH.—Would your university give a man his degree without taking the course in pediatrics?

DR. COTTON.—It never has done so.

DR. ROTCH.—It would seem to be possible and I think that would be going backward. Nine men came up at Harvard this year whose degree depended upon their passing the examination in pediatrics. They cannot get the Harvard degree without passing the examination on pediatrics. I believe a great deal of harm is done by sending men out in the community to practice without a knowledge of the diseases of children.

DR. COTTON.—I think it would be difficult to figure out any important branch that the student could entirely elude, for by doing so he would lose so many points he could not obtain his degree.

DR. ROTCH.—Students are not fitted to choose for themselves what they shall take. They always elude if allowed to elect their studies.

DR. COTTON.—The point I want to make is this—that we have duplicate courses in most of the departments, given by duplicate professors, or a professor and associate professor, and the student may be allowed to elect whether he will take his pediatrics in the fall and winter under Smith, or in the spring and summer under Brown, and I believe it will help the professor to have the competition within his own faculty.

DR. CRANDALL.—An interesting point already referred to is the fact that in many instances the students are more progressive than the colleges, and seem to realize more clearly the need of pediatric instruction than does the faculty. I have observed this in several institutions. In the post-graduate schools the classes in diseases of children are among the very largest. Dr. Chapin's remarks are quite true. The students in those schools are under but slight supervision or control, and in many instances reflect no credit upon the instruction given. The schools themselves are partially responsible for this state of affairs. No supervision whatever is exercised over the students after they have registered and paid their fees. While compulsory attendance could not be enforced, measures could be taken to secure better attendance and to avoid the discredit which is sometimes cast upon the schools.

As to didactic teaching, it seems to me that it has an important place in the medical curriculum, although it has been fashionable of late years to deny it. It is difficult for the student and young practitioner to recognize the difference between the essentials and non-essentials, and it is this very thing that judicious didactic teaching can best bring out. The knowledge of the student runs along an unbroken level, so to speak. All facts are to him of about equal importance. The important facts are minimized, while unimportant facts are magnified. It is the province of didactic teaching to bring out clearly the salient facts of each subject—to set landmarks, so to speak, by which the young practitioner shall find his way among the great mass of confused and less important details.

This requires but little time as compared with the time required to acquire the mass of detail. It is just this work, I believe, that so excellent a teacher as Dr. Rotch attempts to perform in the comparatively few hours devoted to didactic teaching, and the reason that he includes all his subjects in his didactic lectures.

There is a great deal of so-called clinical teaching that is not clinical at all. Many *clinical* lectures in pediatrics are held by bringing a baby before the class in its mother's arms; the teacher asks a few questions regarding the illness of the child and deliberately turns his back and delivers what he calls a clinical lecture. The mere presence of a patient in the room does not change the character of the lecture from a didactic to a clinical one. The

chief criticisms to be passed upon the post-graduate teaching of pediatrics are, I believe, lack of a system on the part of the teacher, and the necessity under which he labors of catering more or less to the wishes of the students. To hold his class well in hand, the teacher is frequently obliged to adopt a course which in his own better judgment is not the best for the students.

DR. GRIFFITH.—A few years ago I had an extensive correspondence with many teachers of pediatrics throughout the country in an effort to find out what was being done in the different schools. Last year I again attempted to acquaint myself as far as possible through catalogues and through information obtained in other ways. I have statistics of the teaching of pediatrics in over 160 schools. This fact is very striking, that in nearly all the younger schools things are on a much better basis. Pediatrics appear to hold a position as good as that of any other department. I feel proud of my *alma mater*, for it is the oldest medical school in the United States; but perhaps for that reason it is one of the hardest to move. But that time will force a change I am sure. As to elective studies, I believe thoroughly that pediatrics should not be elective. The good men will study anyhow, but the bad will not study any subject unless they are made to; and they should be compelled to learn diseases of children.

PULMONARY HEMORRHAGE FOLLOWING EXPLORATORY PUNCTURE OF THE CHEST FOR FLUID IN INFANTS AND CHILDREN.

BY HENRY KOPLIK, M.D.,

Attending Physician, Good Samaritan Dispensary; Adjunct Attending Physician, Mount Sinai Hospital (Children's), New York.

A most startling accident, both to physician and patient, is hemorrhage from the mouth or nose following the introduction of the exploratory needle into chest in the search for fluid or pus. In an article in the *American Text-Book of Diseases of Children* and also in my earlier writings upon pleurisy and empyema in infants and children I advocated the use of the exploring needle attached to the hypodermic syringe as a means of fixing the diagnosis or the character of the fluid which may be in the chest. I have in my writings in common with others dwelt upon the harmlessness of this procedure. At that time my experience was quite large in puncture of the chest, but as it has grown I have met cases in which the above peculiar accident has occurred. It will be of great use to others if my experience is recorded in order that the character and consequences of this accident may be known to those who have had no such experience. For should such an accident occur to the general practitioner, not knowing its course he would be apt to suffer from this lack of knowledge.

The introduction of the exploring needle should not be regarded as entirely harmless. It should be undertaken with a distinct reason. In other words, a physician should confront his patients with a knowledge of chest signs, the result of experience which will protect the patient from the superfluous use of the needle. The needle should rarely be introduced into the chest unless the physical signs warrant its use. I do not agree with those who insist that in cases in which a child has had a pneumonia and the temperature refuses to subside, the needle should be used to clear up the case.

I will illustrate with a concrete case. A child four years old, ill two weeks; illness began with a pneumonia and con-

tinued so for two weeks, with a high febrile movement and delirium. At the end of the two weeks, when called in consultation, I found a pneumonia in the upper lobe of the right lung; there was dulness, bronchophony and a few crepitant râles over this area; below there was slight dulness as far as the base, but the dulness was distinctly relieved by a pulmonary note. Air could be detected by percussion, there was fremitus down the right side as the patient cried; without going further into this case, I found that the chest had been punctured repeatedly for fluid which was not found. Why the fluid was sought was answered only by the fact that temperature was 104° at the end of two weeks' illness. This case recovered without any signs of fluid for which the patient had been punctured, to my mind, unjustifiably.

Another case is the following. I was called in consultation to see a child, female, six years of age. She had had a broncho-pneumonia of which the remains could be distinctly made out by a patch of dulness, slight bronchophony and a few râles (crepitant) pleuritic, on the left side running from the spine of the scapula to near the angle of the bone. The temperature persisted in the evening as high as 104° and dropped to the normal in the morning. It was another case in which the diagnosis and cause of temperature should have been sought elsewhere than in the chest. The physician in charge thought there might be an empyema localized. I pointed out the fact that this was scarcely possible because the dulness over the area was distinctly tympanitic. There was a pulmonary percussion note below and around to the axilla, and yet the physician in charge insisted on the introduction of the exploring needle. On a second visit this was done twice with results which I shall record below, no fluid being found.

I will cite another case. Infant nine months old in the fifth week of a wandering grippal pneumonia, pulmonary resonance simply interrupted on the left side by a spot about an inch in diameter at the centre of the chest behind. Fremitus very good, few crepitant râles, yet in the fifth week of the disease the physician advised introduction of a needle to see if the presence of fluid or pus would account for persistent temperature. This was not done and in a few days the temperature dropped to the normal and the infant recovered. It is not intended that the infants would have been injured by the needle

in the above cases, but they simply illustrate the indefinite grounds on which its use in certain cases is advised.

Take another case seen in consultation. Child two and one-half years of age; sick eleven weeks; had been operated upon in the third week of its illness for empyema. A portion of a rib on the right side had been resected and about a pint of pus evacuated. In spite of this the child did not do well; it had temperatures. The original wound closed. Several physicians called in consultation punctured this side of the chest in spite of the fact that no signs of fluid existed. There were many punctures made, and of course nothing found. In this case the temperature also determined the indication for puncture. The cause of the temperature here also lay outside the chest punctured. It is needless to say from what has been recorded above that the writer does not regard the existence of a temperature alone as a sign of the presence of fluid or pus, or a ground for the puncture of the chest wall with a needle. Hemorrhage either from the mouth, or mouth and nose, has occurred to me about in four cases immediately upon puncture of the chest, and, strange to say, in all cases there was no fluid withdrawn from the chest.

They were cases in which the presence of fluid was doubted from the beginning. In these cases it must have been that the lung was adherent through the pleura with the costal structure, and the needle entered directly into the lung and there caused a wound of some blood vessel which allowed the escape of blood as soon as the needle was withdrawn from the chest. The patients in all of these cases exhibited signs of great unrest, the blood came to the lips and nose in a spurt and was mingled with frothy sputum. In some of the cases the blood came from the nose only and but very little was seen on the tongue. Immediately preceding the above hemorrhage, there was a fit of coughing which continued after the hemorrhage had taken place. In none of the cases was there any collapse or syncope. The presence of blood, however, in all cases, alarmed me greatly and also the parents. I must conclude from my experience thus far that the hemorrhage is similar to that seen in the experimental laboratory. When the lung of a small animal is accidentally punctured and a hemorrhage results from the mouth and nose, the animal dies from a species of suffocation. The lungs are small and the blood fills the bronchii and the animal dies of asphyxia. Autopsy on such

animals made by me revealed but very little to account for death and it could only be explained by the fact that the amount of blood was too great for the size of the animal's lung and, therefore, asphyxia was a mechanical process. In larger animals the result of simple puncture of a pulmonary vessel and hemorrhage is not always fatal as it is in the smaller animal. In children, on the other hand, the puncture of a vessel about the same size as in the animal is insufficient to overwhelm the air passages with hemorrhage and the child if promptly quieted reacts and there is no ill-effect. The expulsive cough and natural stoppage of the hemorrhage is the safeguard in these cases. On the other hand, it has occurred to my mind that a case might arise in which the above favorable circumstances would not obtain, such as puncture of a large blood vessel or a peculiar state of the blood not favorable to coagulation (hæmophilia), in which cases the hemorrhage continuing the child would inevitably die. This is not among the impossible occurrences, if we recall some of the septic cases we deal with, and it is the object of this paper to call attention to the above possibility of a fatal hemorrhage following exploratory puncture of the chest.

It is not intended in this paper to take up the methods of the puncture, but there are some very objectionable points in technique, matters of daily practice which should be avoided in exploratory punctures of the chest in infants and children.

It is my practice rarely to puncture more than once at a sitting. I make certain of the exact place in the chest where I think fluid is apt to be found. The needle is introduced at this point only. Two punctures at a sitting are very rarely called for and it must be some special circumstance which indicates its expediency. The repeated puncture of the chest at one sitting is, I think, uncalled for and shows great uncertainty in methods of examination and physical signs. It is in my mind also unnecessary, for rarely do we find a case of such urgency that a second puncture cannot be postponed. Again I feel that repeated puncture of the chest at the same sitting is fraught with danger on account of the continued struggles of the patient, though held ever so firmly. The needle should be entered at point of greatest flatness or dulness. The puncture should be made with a needle not too large in calibre. There is, it seems to me, a touch of indifference to suffering in using too large a needle in infants and children, and there must be extraordinary

conditions which demand a needle larger than a millimetre in calibre. The needle should not be entered too deeply in the chest wall, at most two centimetres. It should not be entered and then withdrawn and pointed up and down and in various directions in quest of pus, for in this way the struggle of the patient, even if firmly held, causes puncture of the lung and blood vessels. The needle should be withdrawn as rapidly as it is entered and the whole operation should be completed in less than half a minute. I have heard of prolonged puncture (five minutes). This is of very questionable utility.

Puncture should be made cautiously on the left side. Either behind or in front, in vicinity of the heart and great vessels, also behind on both sides close to the spinal vertebræ. I have never punctured in front over the apex of the lung and great vessels.

It has been far from my intention to enter in details of physical signs which in a concrete case would justify the use of the needle. This rather belongs to the very familiar field of the text-book and can only be appreciated by actual study of a case.

66 EAST FIFTY-EIGHTH STREET.

A CASE OF TRANSPOSITION OF THE VISCERA, AND OF THE GREAT VESSELS, WITH PULMONARY STENOSIS AND PERFORATE SEPTUM VENTRICULORUM.

BY J. P. CROZER GRIFFITH, M.D.,

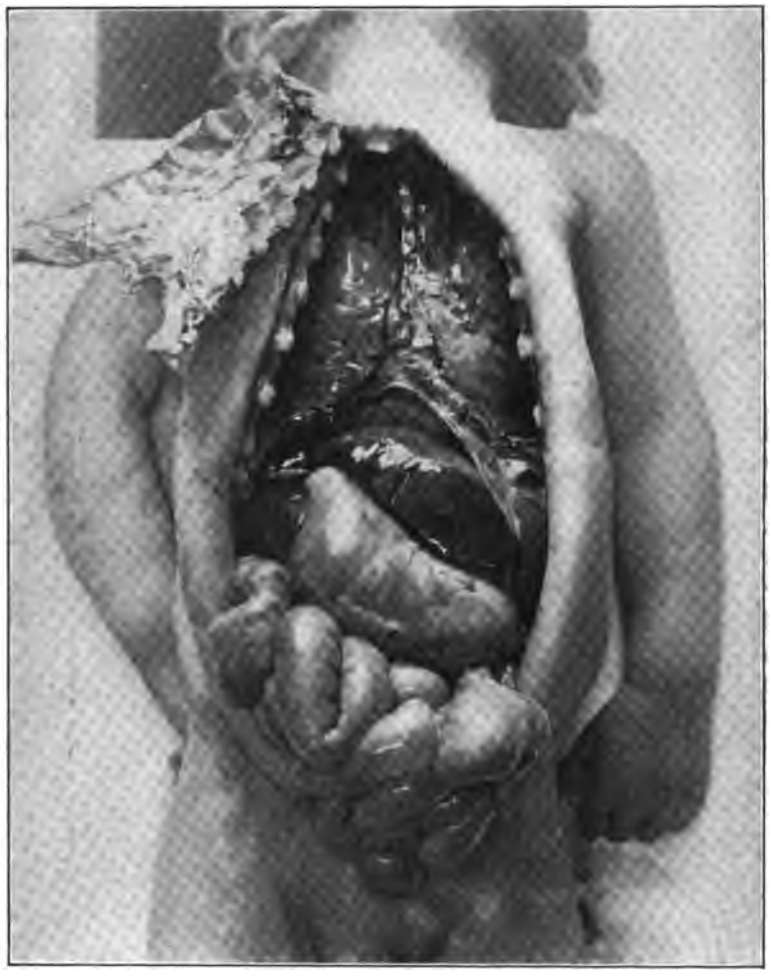
Clinical Professor of Diseases of Children in the University of Pennsylvania.

The following interesting case of transposition of the viscera, with anomaly of the heart came under my observation recently. I desire to report it to the Society, and to exhibit the heart and lungs, and the photographs of the cadaver. The clinical history is as follows:

Wm. B., eight months old, was admitted to the Children's Hospital December 30th. He weighed nine pounds at birth. There is no history of cyanosis exhibited at that time. Three months previously he began to have attacks of cyanosis and dyspnœa, lasting about twenty minutes, and occurring about half a dozen times a day. In these attacks he became blue in the hands, feet, and face, and had rapid breathing, with crying. During the attack he would not take nourishment. Since the beginning of this condition he has always been somewhat blue. He has lost much in weight.

On admission the child seemed ill and was distinctly cyanotic. The notes of the examination made on January 2d read as follows: The child lies apparently comfortably on its back. The face has a decidedly bluish cast, and the body also to some extent. A systolic murmur is heard with greatest intensity at the pulmonary cartilage and at the third left interspace close to the sternum. A murmur is also heard distinctly over the mid-sternum, and faintly at the aortic cartilage and the apex. It is not transmitted into the axilla. There is no thrill. The cardiac dulness is bounded above by the third rib, and on the right side by the left edge of the sternum. The apex-beat is in the fourth interspace within the nipple line.

The diagnosis was made of pulmonary stenosis, probably associated with perforate septum ventriculorum. Further exami-



DR. GRIFFITH'S CASE OF TRANSPOSITION OF THE VISCERA AND GREAT VESSELS.

nation was deferred. The child soon sickened with what appeared to be symptoms of pneumonia. His cyanosis increased and he was so weak that he was treated purely symptomatically and the actual condition of the viscera not investigated by physical examination. This plan of letting alone, while doubtless beneficial to the patient, is the source of regret to us now, as the existence of the transposition of the viscera shown at the autopsy was consequently not discovered *intra vitam.*

The following notes of the *post-mortem* appearances are derived partly from abstracts from the records of the autopsy made by Dr. Alfred Hand, Jr., pathologist to the hospital, partly from personal study of the heart after its removal:

The left lung has three distinct lobes; the right lung two distinct lobes. The heart is evidently hypertrophied. It occupies the normal position in the chest, with its axis running obliquely downwards from right to left. The left ventricle lies chiefly posteriorly, as in the normal heart; its walls are much thickened; the auriculo-ventricular valve has two leaflets. The right ventricle lies more anteriorly, as usual; its walls are somewhat hypertrophied; the auriculo-ventricular valve of this side has three leaflets. The inter-ventricular septum is deficient in its entire upper portion. The foramen ovale is patulous. The aorta arises from the right ventricle, lying to the right of, and, at its origin, somewhat anteriorly to the pulmonary artery. It passes upwards and arches slightly from right to left, but then passes almost directly backwards, arching over the right bronchus and descending in the thorax upon the right half of the vertebral column. In its course it gives off a right subclavian, a right common carotid, and then the innominate, which divides into the left carotid and the left subclavian. The coronary arteries arise from the right ventricle. The pulmonary artery arises from the left ventricle, to the left of, and slightly posterior to the origin of the aorta. It is much narrowed both at the orifice and in its trunk. The valves are small, poorly developed and thicker than normal. The pulmonary artery gives off the ductus arteriosus, a small trunk which is patulous to a large probe up to, but not into, the aorta.

The relative positions of the pulmonary artery and the ascending portion of the arch of the aorta are, therefore, practically identical with those of the normal relation, save only that

there is absent the normal crossing of the beginning of the aorta behind the pulmonary artery from left to right.

The pulmonary veins enter the right auricle. The inferior vena cava ascends through the diaphragm to the left of the median line, and empties into the left auricle. The superior vena cava likewise empties into this auricle. The liver lies chiefly to the left side, its larger lobe being in the left hypochondrium. The spleen lies in the mid-axillary line in the right hypochondrium. There are two supernumerary spleens. The œsophagus descends upon the right side and opens into the cardia of the stomach, which is to the right of the median line. The pylorus lies to the left. The cæcum lies in the left iliac region. The course of the colon is from left to right. The left renal artery and right renal vein are respectively longer than the corresponding artery and vein.

I show the heart and lungs, which exhibit the peculiarities I have described. The accompanying photograph shows the thorax and abdomen opened, and the viscera in their transposed positions.

The variations which congenital cardiac lesions may exhibit, and the variety of combinations which transposition of the viscera, including and excluding that of the heart chambers, may give rise to, is too great to admit of a discussion of them in connection with this mere report of a case. I may say only that this case appears to be one of transposition of the viscera including the great vessels, but not including the chambers of the heart. There was, namely, no dextro-cardia present. The diagnosis of the perforate septum and the pulmonary stenosis was made during life; that of the transposition was not.

This is, I believe, the fifth case of transposition of the viscera which I have been fortunate enough to meet with.

123 SOUTH EIGHTEENTH STREET.

DISCUSSION.

DR. CHAPIN.—I presented a case to the Academy of Medicine in New York some years ago, but my patient was in perfect health, and the transposition of the viscera was only accidentally discovered. The heart was on the right side and the liver on the left.

DR. KOPLIK.—I showed a case similar to that of Dr. Chapin at the Academy. The boy was in good health, but at times

had attacks of asthma. There was a murmur over the pulmonary area, but strictly confined, and there was a question as to whether there was a deficiency of the auriculo-ventricular septum or a stenosis of the aorta.

THE PRESIDENT.—Some years ago I discovered a case of symmetrical transposition of all the viscera in an adult female. That was before I had begun to perform autopsies. Since I entered upon that work, I have made 2,000 autopsies without discovering a transposition of the viscera in an infant.

DR. GRIFFITH.—The first case I saw was when I was a hospital resident, and, not knowing how rare such things were, I did not preserve any specimens. One of the cases I saw was that of a nurse in one of the Vienna hospitals, and it was a favorite plan of the professor to wrap her head so as to disguise her, and then have the American physicians examine her. The curious diagnoses turned in were very amusing. I saw a case last year with Dr. Babcock, of Chicago, where there was undoubtedly transposition with a congenital heart lesion.

THE PRESIDENT.—We have seen quite a number of these cases of stenosis of the pulmonary artery with deficient septum ventriculorum, and yet no transposition.

A PRELIMINARY COMMUNICATION ON THE SEPARATION OF BACTERIA FROM MILK BY NATURAL PROCESS.

BY ROWLAND GODFREY FREEMAN, M.D.,
Attending Physician to the New York Foundling Hospital.

At the last meeting of this Society I presented a collective investigation of the opinions of the members of this Society concerning the heating of milk for sterilization before feeding. The reports received by me made it evident that the majority of the members were inclined to use raw milk when the conditions at the dairy supplying the milk were satisfactory.

I, on the contrary, expressed the opinion that even such milk could not be considered safe, because it was likely to contain a considerable number of bacteria, and we could not make sure that among them there might not be the bacteria causing diarrhœa, typhoid fever, diphtheria, or the germs of measles or scarlet fever. On this account I wish to make a preliminary communication to you on work which is quite incomplete, but which has made it evident to me that the great bulk of bacteria which contaminates milk may separate by natural process from it, without the use of filtration, or heat, or the addition of any preservative. So far as I know this phenomenon has not been previously described.

For obvious reasons the bacterial examination of milk has always been made after a thorough mixing of the milk and cream, so as to obtain a sample of the entire product, and owing to this technical procedure a very interesting and apparently important natural phenomenon has been overlooked.

If milk is allowed to stand and the cream rises, and then a separate analysis is made of the milk and cream, it is found, in the average of a considerable number of analyses which I have so far made, that the cream contains some 300 times as many bacteria as the milk, and with the rising of the cream about 99 per cent. of the bacteria are removed from the milk.

This matter requires much more experiment to corroborate these figures, which are obtained from comparatively few observations.

This separation of the bacteria might seem to be due to the better growth of bacteria in the top layer from the better nutriment furnished by the cream and the greater supply of oxygen; or, on the other hand, it may be due to the carrying up of bacteria by the fat globules as they rise.

An analogous phenomenon to this then would be the purification of water by alum. This precipitate produced by the introduction of alum into water, in settling carries with it the bacteria and thus renders the water practically sterile. Assuming that the fat globules act in a similar manner, this phenomenon in milk might be called inverse precipitation.

This inverse precipitation may take place repeatedly in the same sample of milk, that is, one may allow the cream to separate from a sample of milk; after remixing the milk and allowing it to stand, this separation of the bacteria into the upper layers is again observed.

The extent to which bacteria are removed from the milk by this action may be better appreciated from the following experiments:

One sample of milk that contained 4,240 bacteria per c.c. showed in the milk after separation of the cream, 36 per c.c. Another containing 7,750 showed after separation of the cream only 20. Another containing 18,970 showed after separation 175.

The practical bearing of the observation is obviously very important.

If heating milk to 68° C. or 155° F. is injurious to the milk as an infant food, the bulk of the bacteria present may be separated by natural processes from the milk by allowing the cream to rise and the cream may then be pasteurized or sterilized and afterward mixed again with the comparatively germ free raw milk. This I believe to be true of good milk with few bacteria.

I must apologize for presenting to the society so incomplete an observation, but it seems to me that on account of its practical bearings it might be well to present it even in this form now.

205 WEST FIFTY-SEVENTH STREET.

DISCUSSION.

DR. COTTON.—Were any observations made in regard to the separated milk or the cream obtained by the centrifuge?

DR. FREEMAN.—I have made a great many examinations of this kind. The skimmed milk and the cream both contain a great many bacteria. It is my impression that the centrifuged milk is not as free from bacteria as that separated by natural processes.

DR. ADAMS.—Was the milk in such a condition that bacteria could not fall on the cream? Was it protected from the air?

DR. FREEMAN.—Yes, it was fully protected.

DR. KOPLIK.—I would like to ask Dr. Freeman if he advocates the giving of raw milk to babies?

DR. FREEMAN.—I do not give any raw milk to babies.

DR. KOPLIK.—I think it would be unfortunate if that point were misunderstood, for it is not well for the Society to advise at present the giving of raw milk.

DR. FORCHHEIMER.—Our ideal food in the future is going to be raw milk. The ideal we ought to work for is to have milk produced in such a way that it can be given raw. It is, to my mind, the principal point in infant feeding. While at the present time we may not be prepared to give it raw, except as Dr. Freeman says, under extraordinary circumstances; I have some patients to whom I give it.

DR. GRAHAM.—I have been assured that milk can be procured in such a way as to make the entrance of bacteria into it almost an impossibility, and, I think, just as soon as we can reach that point, just so soon will pasteurization and sterilization pass from the practice of medicine.

DR. ROTCH.—I do not mean to say much against the giving of raw milk, except that you should be sure what the milk is. Some babies cannot take pasteurized or sterilized milk. They do not do well on it and by using the raw milk with the same modifications they will do well.

DR. ADAMS.—I agree with Dr. Forchheimer that the ideal milk is that which is free from bacteria, and three of us are now concerned in a milk farm where the bacteria have frequently been kept down as low as 50 colonies per c.c. Again it has varied and run as high as 250,000. An investigation on that occasion showed that they had washed the cow-shed and, of course, stirred up the dust just before the milking.

THE RENAL COMPLICATIONS OF THE ACUTE ENTERIC DISEASES OF INFANCY.

BY JOHN LOVETT MORSE, A.M., M.D.,

Assistant Visiting Physician at the City Hospital and Assistant Physician at the Infants' Hospital, Assistant in Clinical Medicine, Harvard Medical School, Boston.

The earliest reference to this subject which I have been able to find is by Duer, who, in 1870, reported a case of diarrhœa and nephritis in an infant of seven months. He raised the query whether the intestinal or the renal lesion was the primary, or whether both depended upon some blood lesion.

Kjellberg, however, did the first work in this line, and published his results a little later in the same year. They apparently form the basis for many of the statements made by subsequent authors. He made *post-mortem* examinations at the Allg. Kinderkrankenhaus in Stockholm on 143 infants, dead of acute or chronic enteritis. Nephritis was found in 67, or 46.85 per cent. He also studied both urine and kidneys in 3 non-fatal and 15 fatal cases of acute and chronic intestinal catarrh in children. He found that the urine contained more or less albumin, hyaline, and fine granular casts, and many small, round cells. Examination of fresh sections of the kidneys showed cloudy swelling, moderate fatty degeneration, and desquamation of the epithelium.

Pollack, in 1871, reported 12 cases of hemorrhage from the kidneys occurring in the course of intestinal disorders in children. Section showed thrombosis of the renal veins. His findings have been repeatedly verified.

Thomas, in 1878, stated that he had seen nephritis in acute intestinal catarrh in children, and opined that the irritation of

the kidneys might be caused by organisms absorbed from the intestines.

Hirschsprung, in 1883, examined the urine of infants with intestinal disorders. He stated that section constantly showed a parenchymatous nephritis, and agreed with Kjellberg's opinions as to the frequency and great significance of nephritis as a complication of the intestinal catarrh of sucklings. He did not give the number of cases in which the urine was examined, however, and reported no cases.

Baginsky, in his work, "Die Verdauungskrankheiten der Kinder," published in 1884, mentioned organic constituents in the urine in primary dyspeptic gastro-intestinal catarrh and follicular enteritis, described nephritis in cholera infantum and chronic enteritis, and expressed the opinion that nephritis "is more common in chronic enteritis than is usually expected or known."

In his graduation thesis in 1887, v. Hoffsken said that albuminuria was a constant symptom of cholera infantum, and that the urine sometimes contained blood and pus. The quantity was often diminished, even to anuria. The sediment contained urates, epithelium, lymphoid cells and hyaline, and granular casts. The kidneys almost constantly showed more or less parenchymatous degeneration, varying from cloudy swelling to extreme fatty changes; sometimes embolic nephritis.

Jacobi, in 1888, stated that "nephritis is a frequent accompaniment of acute intestinal catarrh, 'cholera infantum,' and in many cases of chronic diarrhœa, also, the autopsy reveals parenchymatous nephritis." He gave no analyses of the urine, however, and reported no autopsies.

In the same year Hagenbach stated that "nephritis in acute and chronic intestinal catarrh in infancy should be remembered." He apparently considered that it was not common. In the discussion Thomas declared that nephritis was not a frequent occurrence in the intestinal catarrh of sucklings, and v. Jaksch said that he had not found albuminuria in acute intestinal catarrh.

Loos, in 1889, stated that "acute and chronic intestinal catarrh may be complicated by inflammation of the kidneys."

Epstein, in 1890, found, as a rule, no albumin in the intestinal catarrhs of small children which yielded to ordinary medication. In cholera infantum, however, the urine was only ex-

ceptionally free from albumin. He attached great importance to its presence.

Holt, in "Keating's Cyclopædia," published in 1890, made the following statements as the result of his observations on 70 autopsies: "Ever since the writings of Kjellberg it has been the custom to speak of the great frequency of nephritis in the diarrhœal diseases. My own observations have not confirmed his results. I have found well-marked nephritis in but a single case. Cloudy swelling of the epithelium of the tubules is very common, and is seen in all cases where the temperature has been high. Taking the cases as a group, however, the renal changes are just what one meets in pneumonia or in any other acute febrile disease, but are no more marked.

"Small quantities of albumin in the urine are not uncommon in cholera infantum, but casts and renal epithelium are very rare, and blood I have never seen. The kidneys at autopsy are found generally paler than normal, with a marked cloudy swelling of the cortex, but not more than is seen in many other febrile diseases of infancy, as, for example, pneumonia.

"In acute entero-colitis the urine is nearly always diminished in quantity and high-colored, and frequently is loaded with urates. It is not uncommon to find a small amount of albumin, particularly when the temperature is high. But albumin in large amount, renal epithelium, and casts are exceedingly rare. I have met at autopsy with but a single case in which there was nephritis marked enough to have seriously diminished the patient's chances of recovery or to have formed an important factor in the fatal result."

Jacobi, in a discussion in 1892, repeated his previous statements. He said, "there are cases of nephritis which complicate intestinal diseases. When we have to do with an acute or subacute intestinal catarrh, a prolonged seizure may give rise to secondary nephritis. I am positive that it will be found to be much more frequent than it was considered to be."

Le Gendre, in 1894, found that from 6 to 40 per cent. of the infants in asylums showed albuminuria. In dyspeptic infants he observed transient albuminurias during digestion. He considers that, outside of the infectious diseases, gastric troubles and the enteritides are among the more frequent causes of albuminuria.

Czerney and Moser, in 1894, found nephritis in 11 fatal cases of gastro-enteritis in infants under two weeks old. They did not examine the urine in 10 cases of dyspepsia. They conclude that in gastro-enteritis not only albuminuria, as is the case in many affections, but various forms of nephritis occur. On the ground of anatomical investigations these may be regarded as due simply to toxines. The urine contains varying amounts of albumin and the sediment shows hyaline and fine granular casts, epithelial cells and occasional red corpuscles. Sometimes the urine contains blood enough to make it red and the sediment contains red and white cells and blood casts. The conditions of the urine have no corresponding clinical symptoms. The affection of the kidneys does not influence the prognosis unfavorably, unless there be thrombosis of the renal veins. The frequency of nephritis as a complication diminishes with age. They found the most common pathological changes to be swelling and granulation of the epithelial cells of the convoluted tubules and feeble staining of their nuclei. There were numerous casts both in the cortex and in the papillæ. The interstitial tissue showed nothing abnormal. In certain cases, however, they found localized areas of round-cell infiltration, sometimes associated with hemorrhage. Micro-organisms were present in these areas. They consider that the etiology of the renal changes is double—the resorption of toxic substances and the penetration of bacteria into the organism.

Felsenthal and Bernhard, in the same year, published the most complete paper which has been written on the subject. Their results seem to have furnished the basis for most of the statements made by writers since that time. They reported 15 cases with autopsies. Ten of them were under one year and the oldest but two years. They were all cases of vomiting and diarrhœa. Twelve ran a rapid course and seem to have been fairly typical cases of cholera infantum. In two of the protracted cases the pathological changes were the same as in the acute; in the other there were marked interstitial changes everywhere.

The glomeruli showed none or very slight changes. There was fatty degeneration of the epithelium of the convoluted tubules, often extreme, in all cases. Swelling and granular degeneration was also present to a less degree. In 3 cases there was necrosis of the epithelium. The size of the lumen varied

according to the conditions present below. The tubules contained degenerated epithelium, casts, mostly granular, and not infrequently blood. Henle's loops and the straight tubules showed the same degenerative changes, but much less marked. The lumen was often much increased and not infrequently the epithelium was entirely gone. They contained many casts, most of which came from above, and often blood. The blood-vessels showed no important changes. Interstitial changes were present in but 1 case.

They consider that these changes justify the term--acute parenchymatous nephritis. They compare and show their similarity to the changes found in cholera Asiatica. They state that in these conditions, as in Asiatic cholera, there is a marked concentration of the blood. Hence they are inclined to attribute the pathological changes to the circulatory disturbances and the deficient nutrition of the tissues resulting from the concentration of the blood. They admit that toxic absorption cannot be entirely excluded as a cause but consider that it plays but a subordinate part. It may be the most important when vomiting and diarrhœa are slight and death results from toxæmia.

The urine was repeatedly examined in all these cases. It may have been in others also, although no statement to that effect is made. The quantity was not diminished as long as thirst persisted, but was later. The color was amber-yellow or very pale, often cloudy, sometimes, in the last stages, opaque and gelatinous. The reaction was usually strongly acid. Albumin was present in the majority of cases. As a rule there was none or very slight traces during the first few days of acute cases. Large amounts occurred mostly in severe cases lasting some time. However, there was sometimes considerable albumin in the beginning and sometimes none in long cases. The sediment often contained many renal elements when there was only a trace of albumin and often none when there was much albumin. There were cells, often granular, rarely fatty; casts, mostly granular, less frequently hyaline and epithelial; fat drops, free or on casts. Leucocytes and occasional red cells were also found. Mucus was almost always present. There was often much uric acid, sometimes urate of ammonia and calcic oxalate. Bacteria were sometimes found in fresh urine.

Seibert, in 1895, stated that in the previous six months he had seen 4 cases of acute nephritis in the course of acute gastro-

intestinal catarrh, accompanied by fever. In all cases of enteritis where the rise of temperature persisted for three or more days he found albuminuria. Whenever the sediment was examined the morphotic constituents of the urine always found in nephritis were never absent. In chronic enteritis he never found the urine free from albumin, casts and epithelia, white and occasional red blood corpuscles. He gives no data, however, as to the number of cases on which these statements were founded. He concludes "that the examination of the urine during enteritis has been neglected by many, for, otherwise, the fact that even modern writers do not mention the possibility of a complicating nephritis, would be inexplicable."

Jacobi, in a paper entitled "Nephritis of the Newly-Born," published in 1896, says: "We know . . . that acute or chronic intestinal diseases may be complicated with or followed by nephritis. . . . Quite frequently both acute and chronic intestinal diseases appear to be the causes of nephritis, which may be quite ominous. . . . The literature on the subject is but scanty. I have, however, reason to believe that even those who have known the connection between intestinal diseases and nephritis quite well have not published their experience." He reports 1 case in an infant of five days and refers to another. This is the only proof adduced for his very general statements. He then goes on to say that the secondary nephritis in intestinal diseases "evidently depends on the absorption of a toxine. . . . Their absorption is facilitated by some peculiar anatomical conditions.

"A predisposition to nephritis in the young is caused by the fragility of the blood-vessels in the newly-born; by the relative imperviousness of the young renal capillaries compared with the large size of the renal arteries; by the feebleness of the young intestinal muscle, which proves insufficient to expel toxic contents; by the extensiveness and size of the young intestinal blood-vessels and lymphatics and the large size of the villi, all of which favor the absorption of toxines."

Taft, writing in 1897, states that abnormal alimentary changes often stand in the relation of cause to effect in the nephritis of children, and that the changes in the intestinal contents give rise to a toxine or toxines which act injuriously upon the kidneys, just as do the toxines of the infectious fevers. He reports three unconvincing cases, and gives no further proof for his statements.

The text-books on the diseases of children, as a rule, pay but slight attention to nephritis as a complication of intestinal disorders. Ashby and Wright say that "albuminuria frequently occurs during acute diarrhœa," and that "nephritis and uræmic convulsions have been described by some authors."

Henoch states that "in acute gastro-intestinal affections" (fermental diarrhœa) "the urine very often, even in the first twenty-four hours or forty-eight hours, contains albumin, although formed elements of nephritis are found in only a part of the cases. In catarrhal diarrhœa" (ileo-colitis) "a complicating nephritis may be the cause of death."

Rotch says that in ileo-colitis "the urine is nearly always lessened in quantity, is high-colored, and sometimes contains a small amount of albumin, especially when the temperature is high. Acute nephritis is, however, rare in these cases." He makes no reference to the condition of the urine in other diarrhœal diseases.

Smith merely remarks that "the urine is scanty," and says nothing regarding either albuminuria or nephritis.

Vaughan says that in sub-acute milk infection his "own observations and belief support the views of these American authorities"—Holt and Smith. In chronic intestinal indigestion "structural changes in the kidney, with albuminuria, may occur."

Baginsky says that "nephritis is one of the most important complications of the acute dyspepsias and diarrhœas of children." He quotes his "former assistants," Felsenthal and Bernhard, as well as Czerney and Moser, and apparently bases his opinion largely on their work.

Lesage says that "renal complications sometimes occur in gastro-enteritis." He quotes Felsenthal and Bernhard largely, and evidently founds his statements on their results rather than on his own experience.

Renault says that "enteritis . . . and cholera infantum may be complicated by acute nephritis; this occurrence is happily rare. Prolonged digestive disturbances frequently enough cause chronic nephritis in the infant, almost always after having produced repeated hepatic congestion."

Holt practically repeats his statements in "Keating's Cyclopædia," and maintains his position.

Taylor and Wells state that acute exudative nephritis "occasionally follows the acute diarrhœal diseases," and that in

sub-acute milk infection "other diseases, such as nephritis, . . . not infrequently appear later in feeble children."

It seems rather hard to reconcile these varied opinions as to the frequency of renal complications in the acute diarrhœal diseases of infancy. It is noticeable, however, that few of them are based upon actual observations. The majority are either merely bald statements of opinion without any apparent foundation in fact or restatements of the opinions or conclusions of others, which latter may or may not have been based on actual experience. It is striking, nevertheless, that the great majority of those who have written special articles on the subject are convinced of the frequency of these complications.

Holt's is the only one of the text-books that gives any data founded on actual personal results. The slight notice which the majority of them give the subject, however, would seem to justify the assumptions that their authors have rarely met these complications and that they consider them of but little importance. It is possible, however, that they have never looked for them.

The articles of most value, because founded on facts, are those of Kjellberg, Czerney and Moser, Felsenthal and Bernhard, and Holt. It is hard to explain the discrepancy in their results. A possible explanation of the marked pathological changes found so constantly by Czerney and Moser and Felsenthal and Bernhard may be found in the fact that they studied scarcely any but very acute, rapidly fatal cases of what may probably be properly classified as cholera infantum. Although Kjellberg and Holt make no statements as to the character of their cases it is probable that they were more varied in type and included many of the less severe forms.

It is reasonable to suppose that all fatal cases of these diarrhœal diseases, which are often accompanied by high temperature, always by toxic absorption and sometimes by the entrance of bacteria into the circulation, should show more or less marked degenerative changes in the kidneys and not infrequently acute inflammatory changes. It is also reasonable to suppose that concentration of the blood in very acute cases may cause additional degenerative changes. It is presumable, moreover, that similar pathological changes occur in the great majority, if not in all, of the severe non-fatal cases and in many of the mild cases.

Most of the pathological changes which have been described are degenerative in character and not inflammatory. Even in the severest cases there have usually been no inflammatory changes or, if present, they have been very slight. The pathological findings, therefore, seem to afford but little justification for the statements as to the great frequency of nephritis in the acute diarrhœal diseases of infancy. They seem rather to show that this complication is unusual. They do show, however, what would naturally be expected in acute diseases accompanied by toxic absorption, *i.e.*, degeneration. Their chief prognostic importance is, therefore, probably rather as a measure of the degree of toxic absorption than of interference with the renal function.

The data given as to the condition of the urine, both in fatal and in non-fatal cases, are of much less value. There are no records of the results of the urine in any large series of cases and the statements made are almost all general. In addition to the examinations made in the fatal cases, already considered, the studies of v. Hoffsken, Epstein and Le Gendre are of the most value. While there is considerable difference of opinion as to the frequency with which albumin and pathologic organic constituents are found in the urine their results agree in a general way. The urine is, as a rule, diminished, sometimes suppressed. Albumin is more common and more abundant in severe than in mild cases. The amount of albumin is usually not large. The sediment contains renal cells, more or less degenerated, and casts, mostly of the fine granular form. Blood and blood elements are uncommon and, if present, occur only in small amounts. These changes are most marked in cholera infantum. This condition of the urine, however, is not that which is usually accepted as typical of acute nephritis. It corresponds rather to the type which is found in active hyperæmia of the kidneys. Unfortunately the classifications of renal disorders from the standpoints of the clinical examination of the urine and of the pathological changes are at present not in accord and attempts to reconcile them lead only to confusion. It is impossible to determine from the condition of the urine whether or not there are microscopic inflammatory changes in the kidney as well as degenerative. Pathologically, however, the diagnosis of nephritis depends on the presence or absence of inflammatory changes. This condition of the urine, nevertheless, is

that which is ordinarily found in many diseases in which there are degenerative changes, usually not accompanied by inflammatory changes, in the kidneys. In these diseases it is not ordinarily considered as indicative of acute nephritis and is not regarded of any very serious prognostic import. There seems to be no very evident reason why it should be considered to be of any different nature or of any more prognostic importance in the diarrhœal diseases of infancy.

During the summer of 1898 I examined the urine of 70 infants ill with uncomplicated diarrhœal diseases. They were all out-patients at the Infants' Hospital. Hence the urine was seldom examined more than once in the same case. They were all under two years of age, 47 being under one year. The urine was always obtained by catheterization. A No. 8 French, soft-rubber catheter was used. No difficulty was found in passing it, either in males or females, even in infants but two or three months old. At times, however, a little resistance was encountered at the neck of the bladder and the sediment almost always afforded a beautiful opportunity to study the epithelium of the urethra and bladder. Scrupulous care was taken as to the cleanliness of the catheters and, as far as known, no injury whatever resulted from their use.

No attempt was made to select any special line of cases as to type, severity or duration, but rather to examine as great a variety as possible. The clinical diagnosis was fermental diarrhœa in 64 and ileo-colitis in 6. The bladder of the only case of cholera infantum seen during the summer was empty.

The color and reaction of the urine were always noted and the specific gravity taken when the amount was sufficient. The test for albumin was always made by heat. No test was made for sugar. The urine was always centrifugalized, the whole amount obtained generally being used, and the sediment examined microscopically. It always contained many urethral and bladder cells.

The following points were noted in every case. The previous general condition; the present general condition; the rectal temperature; the duration of the illness; the presence or absence and the amount of vomiting; and the number and character of the dejections. The following table, arranged according to the day of the disease, gives these data as well as the results of the examination of the urine:

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FERMENTAL DIARRHŒA.

No.	Day of Disease	Age Months	Previous Condition	Present Condition	Temp. Rectal	Vomiting	DEJECTIONS. No.	Color	Curds	Mucus	Blood	Odor	URINE. Color	Reaction	S. G.	Alb.	Sediment
1	1	6	Good	F. D. & N.	37.2°	O.	Many	Green	O	O	O	—	High	Acid	—	O.	
2	1	11	Good	Normal	37.7°	O.	6	Green	+	+	O	Foul	Pale	Acid	—	O.	
3	2	3	Poor	Small, Thin, Feeble	39.2°	Much	8	Green	+	O	O	—	High	Ac. +	—	O.	Ū.
4	3	16	Good	W. D. & N.	37.8°	4-10 i. d.	6-10	Green	O	+	O	Foul	N	Acid	1020	Trace	Occas. small round cell. Rarely a hyaline cast. Ammon. urates.
5	3	20	Good	W. D. & N.	37.4°	O.	15	Yellow	+	O	O	Foul	N	Acid	1016	O.	Caō.
6	3	6	Fair	W.D. & N. Rickets	37.2°	O.	Many	Green	O	+	O	—	Pale	Ac. +	1006	O.	
7	3	3	Fair	Fair	37.8°	Little	6-8	Green	O	O	O	Foul	Pale	Acid	—	Slt. Trace	Few renal cells. Occas. hyaline and fine granular cast. Pus. Urates.
8	3	11	Good	Large and Fat	39.2°	Some for 24°	10-12	Y.&G.	O	+	O	—	Pale	Ac. +	—	O.	
9	3	10	Good	W.D.&N. very sick	40.0°	5-8 i. d.	15-20	Y.&G.	+	+	O	Foul	High	Ac. +	1018	O.	Mucus.
10	4	10	Fair	F. D. & N. Sick	40.0°	6-7 i. d.	5-6	Green	+	O	O	Foul	High	Acid	—	O.	
				Better, 4d. later	38.9°								Pale	Ac. —	—	O.	
11	4	10	Fair	Fair, lost much wt.	38.2°	Some for 24°	25-35	Green	O	+	O	O	N	Ac. +	—	O.	Amorph. urates.
12	4	6	Good	W. D. & N.	37.4°	2-3 i. d.	12	Green	+	+	little	Foul	Pale	Ac. —	1002	O.	
13	5	11	Good	Normal	38.4°	Some for 24°	7	Y.&G.	+	O	O	Foul	N	Ac. —	1018	O.	
14	5	11	Poor	Small, Thin, Bad.	37.8°	Constant	15-20	Green	O	+	O	—	Pale	Ac. —	1003	O.	
				No better, 1m. later	37.2°	Much.	Many	Y.&G.	+	+	O	—	Pale	Acid	1003	O.	
15	5	7	Good	Normal	38.2°	O.	7	Y.&G.	+	O	O	Foul	Pale	Ac. —	—	O.	
16	5	15	Good	Normal	37.0°	O.	10-12	Green	O	+	O	Foul	N	Acid	—	O.	Amorph. urates.
17	6	18	Good	Normal	37.6°	O.	10	Green	O	+	little	—	Pale	Acid	1008	O.	Much Ū.
18	6	6	Good	Normal	37.4°	Some for 5d.	10-15	Yellow	O	+	O	—	Pale	Acid—	1010	O.	
19	7	16	Good	W. D. & N.	38.0°	O.	10-12	Y.&G.	+	+	O	Foul	N	Acid	1006	O.	Ū.
20	7	11	Good	W. D. & N.	38.4°	O.	5-8	Green	+	+	O	—	High	Acid	—	O.	Ū. Mucus.
21	7	22	Good	W. D. & N.	37.5°	O.	10-12	Green	+	+	little	Foul	N	Acid	1011	O.	
22	7	9	Fair	P. D. & N.	37.2°	Some for 4d.	6-8	Y.&G	+	+	O	Foul	N	Acid	—	O.	
23	7	15	Poor	Pale, Thin, Rickets	37.5°	Frequent.	9-10	Yellow	+	+	O	—	N	Ac. +	—	Slt. Trace	Occas. small round cell. Rarely a hyaline and fine granular cast. Amorphous urates.
				Well 7d. later									Pale	Neutral	—	O.	

	FERMENTAL DIARRHŒA.						DEJECTIONS.						URINE.				
No.	Day of Disease	Age Months	Previous Condition	Present Condition	Temp. Rectal	Vomiting	No.	Color	Curds	Mucus	Blood	Odor	Color	Reaction	S. G.	Alb.	Sediment
24	7	9	Fair	F. D & N. Pale.	38.0°	Much.	20	Green	+	+	little	Foul	Pale	Ac. —	—	O.	
25	7	14	Good	W. D. & N. Well.	37.3°	O.	6-8	Green	+	O	O	—	N	Acid	1008	O.	
26	7	20	Fair	F. D. & N.	38.0°	O.	15	Y.&G.	O	+	O	Foul	N	Acid	—	Slt. Trace	Many cells, few renal. No casts.
				Nearly well, 1 wk. later.	37.4°								High	Ac. +	—	Slt. Trace	Same. Caō.
27	7	13	Good	W. D. & N.	37.3°	O.	12	Y.&G.	+	O	O	—	High	Acid	1024	O.	Amorphous urates.
28	7	12	Good	W.D.&N. Lost wt.	37.3°	O.	Many	Yellow	O	+	O	Foul	Pale	Ac. +	1004	O.	
29	7	7	Good	Much prostrated.	41.0°	Constant	15-20	Green	+	+	O	Foul	N	Ac. +	—	Lr. Trace	Numerous small round cells, Hyaline and fine granular casts and casts with cells adherent.
				Better. 3d. later.	37.8°	O.	0						Pale	Acid	—	O.	
30	7	2	Poor	Small. Feeble.	38.0°	Slight. 1d.	5	Green	+	+	O	Foul	Pale	Ac. —	—	O.	
31	7	14	Good	F. D. & N. Fair.	37.6°	Some for 24°	10	Y.&G.	+	+	O	—	Pale	Ac. —	1006	Slt. Trace	Much pus. Large round cells. (Turbid)
				Better. 2d. later.									Pale	Ac. —	1007	Slt. Trace	Much pus. (Turbid)
				11d. later.									Pale	Ac. —	1005	Slt. Trace	Much pus. Few large round and squamous cells (Turbid)
				1 wk. later. No G. I. symptoms.									Pale	Ac. —	1002	Slt. Trace	Pus. (slt. Turbid)
32	9	13	Good	Normal.	38.7°	O.	8-10	Green	O	+	O	Foul	N	Acid	1014	O.	
33	10	22	Fair	Prostration.	38.2°	Constant	15	Y.&G.	+	+	little	—	Pale	Ac. —	1004	O.	
34	10	3	Poor	Poor.	39.4°	O.	10	Y.&G.	+	+	O	Foul	Pale	Acid	—	O.	
35	11	10	Good	Very sick.	37.8°	Much.	8-10	Green	O	+	O	Foul	N	Acid	1011	O.	Ammon. urate.
36	12	9	Good	Good.	37.6°	Often.	12	Green	O	+	O	Foul	N	Ac. +	—	O.	Ū.
37	13	13	Good	W. D. & N.	37.5°	O.	8-9	Green	+	O	O	Foul	N	Ac. +	—	O.	Ū.
38	14	10	Good	Normal.	38.2°	O.	15	Yellow	O	O	O	Foul	N	Acid	—	O.	
39	14	23	Good	Normal.	37.2°	O.	7	Green	O	O	O	—	High	Ac. +	1024	O.	Amorphous urates.
40	14	11	Good	Normal.	37.5°	O.	15-16	Green	+	+	O	Foul	N	Acid	—	O.	Amorphous urates.
41	14	23	Good	Good.	37.3°	O.	4-6	Y.&G.	+	+	O	Sour	N	Acid	1028	O.	Ū.
42	14	8	Good	W. D. & N.	37.4°	Much	10-11	Yellow	+	O	O	—	N	Acid	—	O.	Amorphous urates.

FERMENTAL DIARRHŒA. DEJECTIONS. URINE.

No.	Day of Disease	Age Months	Previous Condition	Present Condition	Temp. Rectal	Vomiting	No.	Color	Curds	Mucus	Blood	Odor	Color	Reaction	S. G.	Alb.	Sediment
43	14	7	Poor	P.D. & N. Lost wt.	39.2°	O.	20	Green	+	+	O	Foul	High	Ac. +	—	O.	
44	14	12	Poor	F. D. & N.	38.0°	O.	10	Green	+	+	O	Foul	Pale	Acid	1010	O.	
45	14	6	Good	Good.	37.0°	O.	15	Y.&G.	O	+	O	Foul	Pale	Neutral	1003	O.	
46	17	13	Good	Good. Improving.	38.0°	nonenow; hasbeen	5-12	Green	+	+	O	—	Pale	Acid	—	O.	
47	21	10	Good	W. D. & N.	37.4°	O.	10-20	Y.&G.	O	O	O	—	Pale	Acid	1004	O.	
48	21	16	Fair	F. D. & N.	38.0°	O.	12-15	Green	+	++	little	—	N	Acid	1016	O.	
49	21	19	Good	Normal.	37.2°	Much up to past 4d	3-20	Green	O	+	little	Foul	Pale	Ac.—	1004	O.	
50	21	10	Good	Normal.	38.2°	O.	10-12	Y.&G.	O	+	O	—	Pale	Acid	—	Slt. Trace	Occas. small round cell. Ū. No casts.
51	28	13	Good	W.D.&N. Lost wt.	38.2°	O.	7-10	Green	+	O	O	Foul	N	Acid	—	O.	Amorphous urates.
52	28	7	Fair	Lost much wt.	39.4°	Occasional.	3-10	Green	O	+	O	—	Pale	Ac. —	1006	O.	
53	28	3	Good	W. D. & N. Losing wt.	38.0°	Considerable.	6-7	Y.&G.	O	+	O	Foul	Pale	Ac. —	—	Slt. Trace	Occas. small round cell. No casts.
54	35	13	Good	Good. Lost much wt.	38.1°	After each feeding	4	Green	+	O	O	—	High	Ac. +	1030	Slt. Trace	Occas. small round cell. Rarely a hyaline cast.
55	35	11	Poor	Emaciated. Sick.	37.8°	Much.	15-20	Green	O	+	O	—	N	Acid	—	O.	
56	35	15	Good	W. D. & N. Prostration.	39.2°	Much.	8	Yellow	O	O	O	Foul	N	Acid	1015	O.	Ammon. urate.
57	35	12	Good	W. D. & N. Normal.	37.3°	O.	20	Green	O	+	O	—	Pale	Neutral	1003	O.	
58	35	8	Fair	F.D.& N. Lost wt.	37.4°	Occasional.	14-15	Green	O	+	O	Foul	Pale	Acid—	1001	O.	
59	35	12	Good	Flabby. Lost much	37.6°	O.	15	Green	O	+	O	Foul	N	Acid	1008	O.	Ammon. urate.
				Recurrence 3 wks. later.	37.8°	O.	15-16	Green	O	+	little	—	N	Acid	1007	O.	
60	35	4	Poor	P. D. & N.	37.0°	Rarely.	5-8	Y.&G.	+	+	O	N.	Pale	Acid	—	O.	
61	42	7	Fair	F. D. & N.	38.4°	Frequent.	10-12	Yellow	O	O	O	—	N	Acid	1021	O.	
62	42	12	Poor	Small, Thin, Bad.	39.4°	Moderate.	10	Green	+	+	O	Foul	High	Ac. +	—	Consid.	Small round cells. Occas. hyaline and fine granular casts. Ū and amorphous urates
				No better. 5d. later	38.0°	6-7 i.d.	3						N	Acid	—	Trace	Hyaline and epithelial casts. Ammon. urate.
				(Otitis media. Mastoid Abscess) Broncho-Pneumonia.													

	FERMENTAL DIARRHŒA.						DEJECTIONS.						URINE.				
No.	Day of Disease	Age Months	Previous Condition	Present Condition	Temp. Rectal	Vomiting	No.	Color	Curds	Mucus	Blood	Odor	Color	Reaction	S G.	Alb.	Sediment
63	60	15	Good	W.D.&N. Lost wt.	37.4°	Occasional.	5-6	Green	+	+	little	—	High	Acid+	1019	O.	Mucus.
64	63	17	Good	Flabby Lost much	37.0°	O.	20	Green	+	+	O	Foul	Pale	Ac. —	—	O.	
	ILEO-COLITIS.																
65	4	23	Fair	Fair.	38.0°	O.	20-30	Green	O	+	little	—	N	Ac. +	1016	Slt. Trace	Occas small round cell. No casts.
66	4	23	Good	Normal.	38.0°	O.	very many	Y.&G.	+	++	Some	—	N	Ac. +	—	O.	Ü.
67	5	11	Fair	Pale. Normal. Better. 11d. later.	38.5° 37.2°	Some at first. O.	15-20 8	Green Y.&G.	+ +	++ +	little O	— —	N N	Ac. — Acid.	— 1011	O. O.	
68	8	23	Fair	Good.	38.0°	O.	15	Green	+	+	+	Foul I	N	Acid.	1008	O.	
69	14	8	Good	W. D. & N. Lost much wt.	37.4°	Occasional.	8-12	Y.&G.	+	++	+	—	Pale	Ac. —	—	O.	
70	42	11	Good	Very sick.	38.0°	O.	15-20	Y.&G.	+	+	+	—	Pale	Neutral	—	O.	

+ — Present. O — Absent. — — No data. Sediment always contained many cells from urethra and bladder.

No. 62. Died 2 days later.
No. 7. Died 2 months later.
No. 4. No further data.
Nos. 53 and 54. Improving when last seen.
Nos. 23, 26, 29, 31, 50, 65. Recovered.

Outside of cholera infantum, this table contains almost every possible variety of case, whether as to duration, severity or combination of symptoms. It is hard to find any type of case which has not at least one representative. It would seem, therefore, that an analysis of the table should give fairly representative conclusions.

The color of the urine, estimated as for adults, was high in 12 examinations, normal in 33 and pale in 36. As the normal color for an adult is high for an infant of under two years, it is safe to consider that the color of the urine was higher than the normal in nearly 60 per cent.

The reaction of the urine was acid in all but 4, in which it was neutral. Estimated roughly with litmus paper, the acidity was high in 17 and feeble in 21. As the acidity of the urine in infants is normally feeble, the conclusion that the acidity was, as a rule, increased seems warranted.

The specific gravity was taken 41 times. The highest was 1030 and the lowest 1001. The great majority were within the normal limits for infants. In the light of the increased color and acidity it seems rather surprising that the specific gravity was not also increased. This apparent discrepancy is explained, however, when it is remembered that the specific gravity was taken only when a relatively considerable amount of urine was obtained. This, of course, was usually only in the cases in which an approximately normal amount of urine was being secreted. It is probable that it was higher in the other cases.

Although nothing was determined as to the total amount of urine passed in twenty-four hours, the color, the reaction, and, to a large extent, the specific gravity seem to justify the conclusion that on the whole there was a tendency to concentration of the urine. The concentration of the urine bears no evident relation to the duration or severity of the illness, the number or character of the dejections, and the amount of vomiting. A high temperature, however, was almost always accompanied by concentration.

Albuminuria was present in 11 cases. In one, however, the sediment showed that it was probably entirely due to a complicating cystitis. This leaves 10 cases, or a little more than 14 per cent., in which it was presumably due to renal complications. In 4 of these no casts were found. The sediment

contained, however, more or less small, round cells, which may have been renal in origin. In 2 cases hyaline casts alone were found; in 2, hyaline and fine granular casts; in 2, hyaline, fine granular and epithelial casts. No blood or blood elements were found in any case. Except in one instance, the amount of albumin was always small. In that one it was designated as considerable. In the others it was called a large trace in 1, a trace in 2, and a slight trace in 8. The number of casts was always very small.

Careful study of these cases fails to reveal the slightest relation between the presence of albumin or renal elements in the urine, and any symptom or set of symptoms. Nor does there seem to be any connection between them and the duration or severity of the disease. They were present as early as the third day, and absent in cases ill as long as nine weeks. They occurred in mild cases and were absent in severe ones, and *vice versa*.

In one case the albumin and renal elements had disappeared at a second examination after three days, and in another after seven days. In another, in which there was albumin but no casts, the albumin was still present at the end of a week, although the patient was nearly well. These three (23, 26, and 29) and two others (50 and 65) are known to have recovered. Two more (53 and 54) were improving rapidly when last seen. Another was not seen again, and nothing is known as to the ultimate result. It was a mild case clinically, however, and probably did well. One (7) died two months later, the gastro-intestinal symptoms having continued. No symptoms referable to the kidneys developed, however. The last case (62) died two days after it was last seen. The other complications—broncho-pneumonia and mastoid abscess—certainly had more to do with the fatal termination in this instance, however, than did the renal. A considerable number of the cases in which there were no renal complications, as shown by the examination of the urine, also died. It is evident, therefore, that albumin and casts were not of bad prognostic import.

Mucus was noted in the sediment in 3 cases, uric acid in 10, amorphous urates in 10, ammonia urate in 5, and calcic oxalate in 2. None of these, however, seemed to denote anything of practical importance.

CONCLUSIONS.—The following conclusions seem justified as regards the renal complications of the acute diarrhœas of infancy, aside from cholera infantum. It is probable that more or less marked degenerative changes occur in the kidneys in many, if not most, cases. These degenerative changes are due to the action of bacteria or of toxines, almost always to the latter. Inflammatory changes are rare. As the result of the degenerative changes in the kidneys albumin and renal elements may be found in the urine. Albuminuria occurs in about 15 per cent. of all cases. The sediment contains casts, usually hyaline and fine granular, in about 60 per cent. of the cases in which albuminuria is present. The presence of albumin and casts does not justify the term "nephritis." Nephritis is a very unusual complication of the acute diarrhœal diseases of infancy. The occurrence of albumin and renal elements in the urine is not dependent upon any other symptom or combination of symptoms. It is not of bad prognostic import. Concentration of the urine is common. It varies with the temperature rather than with other symptoms. It is probable that more marked pathological changes, possibly somewhat different in their nature, occur in cholera infantum, and that the resultant changes in the urine are also more marked. It does not seem probable, however, that their prognostic importance is much greater.

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317 MARLBOROUGH STREET.

DISCUSSION.

DR. KOPLIK.—I published a paper in January in which I reported a number of cases of gastro-enteritis and the examination of the urine showed in the majority a trace of albumin and casts. In those cases I tried to trace a connection between the presence of these elements in the urine and some of the symptoms present. As you have heard from the paper, hitherto no such attempt has been made. I think Dr. Morse says there are no symptoms that can be traced to the condition of the urine and the process going on in the kidneys. I think it was Booker in the first place who pointed out that in the fatal cases of gastro-enteritis we not only had a distinct form of change present in the kidney, but also the presence of bacteria in the kidney. As to the symptomatology, I found that in the severer cases a peculiar and distinct form of œdema; not the œdema we find in scarlet fever, but an œdema where all the tissues were somewhat shrunken away. The child was emaciated, and there was distinct pitting on pressure, very much like that found in some severe forms of atrophy with impending death. In many of these cases the vomiting was persistent and the children were rather apathetic, so that I thought possibly the condition of the kidney tended to increase the stupor. Of course, I was not very positive that these symptoms were due to the kidney, but they were more prominent than in the cases where the urine was not suppressed.

I found albumin present more constantly than Dr. Morse did and my method was to boil the urine, then add nitric acid and hold it up against a black background so that the least trace of albumin was found. I found that the amount of albumin was not commensurate with the presence of casts as did Dr. Morse, and that is a strange part of this affection. As to the presence of cast elements I found them much more constant than Dr. Morse did and I think it quite possible that our material was different. As to the prognosis I believe with Dr. Morse that the great majority of these cases get well under conservative treatment.

DR. ADAMS.—I have not entered into such an extensive investigation as Dr. Morse did, but I have examined a number of cases of infants with anuria, sometimes lasting for hours or a day, and the results have been just about what he has given. So far as the œdema is concerned I have seen a number of cases of colitis where, after the symptoms have disappeared, a marked œdema with general anasarca came on and an examination of the urine has failed to give any evidence of serious structural changes in the kidney. I have usually attributed this condition to hydremia and the loss in many instances of the

comparatively small amount of blood. I have seen their hands and feet puffed and the eyes closed completely.

DR. CHAPIN.—I have been surprised to note in hospital practice what a large percentage of children with diarrhœa have albuminuria. I may also say that it is common in other diseases and I have sometimes thought that a study of the urine should be made in all the ailments of infancy, to determine in what proportion of cases the kidney is affected. The question arises as to the method of collecting urine from little babies. My own methods are perhaps very crude and I must confess I have a little anxiety as to passing catheters on babies. It is easy to pass them on girl babies but for boys I prefer to put a bag around the penis and collect the urine in that way. For female infants we might use a clean sponge applied directly over the vulva and in that way collect a sufficient amount for examination. I prefer this to catheterization, although when carefully done, as Dr. Morse did it, there seems to be no bad results.

DR. COTTON.—In regard to the collection of urine by sponge or absorbent cotton I think that has a tendency to filter the urine and thus cloud the results of the examination. Dr. Morse seemed inclined to apologize for the high specific gravity in his cases, but it has been my experience that in the enteric disorders with frequent discharges the specific gravity usually rises.

THE PRESIDENT.—Did you observe the children afterwards to see if any harm was done by the catheter?

DR. MORSE.—I was induced to undertake this investigation because of the looseness of the statements of many writers in many text-books as to the frequency of nephritis in these conditions. I am surprised that nobody has called attention to one weak point in my work and that is that the urine was examined but once in most of the cases. It is possible, therefore, that these babies may have had albuminuria either before or after the examinations, although they did not have it then. My results are for this reason open to criticism. The conditions under which the work was done, however, rendered separate examinations impossible.

As to the relation of restlessness and stupor to the condition of the kidneys in these intestinal disorders my opinion is that they are due, therefore, rather to the amount of toxic absorption than to the kidneys; that is, that the condition of the kidneys and the general system are the results of the same cause—toxic absorption. As to the discrepancy between Dr.

Koplik's results and mine, I can only suppose that his cases were more severe than mine. I examined the urine against a dark surface and considered the least cloudiness to be indications of albuminuria. If there was any error it was in calling urine cloudy which was not.

As to the catheterization of babies I expected some criticism on that point, but I feel that it is perfectly possible with due precaution to catheterize them without doing any harm. I have seen many of these babies since. I did not examine the urine again, however, and there is the possibility that they had cystitis, although they showed no symptoms of it. I certainly should feel inclined to collect the urine in some other way if I could. With the babies that come to the Out-patient Department, however, you cannot use these other methods and cannot wait for the baby to pass urine. If you want it you must draw it.

ENLARGED BRONCHIAL NODES: A MANIFESTATION OF LYMPHATISM.

BY J. PARK WEST, M.D.,

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Within the past six years there have been under my care eight children in whom the diagnosis of enlarged bronchial nodes was made, and who were brought to me on account of the accompanying cough. The first two cases were published in the ARCHIVES OF PEDIATRICS for May, 1896, under the title "Enlarged Bronchial Glands Relieved by Creasote." The marked and speedy effect of small doses of creasote on the cough in these two children seemed to make the cases worthy of record on that account alone. The same beneficial effects of this drug in small doses was seen on the nodes and in the general improvement in the other six cases, but no similar effect was noticed on the enlarged tonsils and adenoids when present. The two cases published were brother and sister. The brother when fourteen months old had an attack of bronchitis followed by a cough lasting nearly nine months. It ceased during the summer to begin in the fall, but after coughing two weeks he was given creasote in half drop doses and in four weeks the cough ceased. The sister, two and a half years younger, when seven months old began with the same cough. It was as quickly relieved by the same remedy, which was administered to her for several weeks with permanent benefit to her general health. Further acquaintance with these two children and the care of the other six, leads me to believe there are other points of interest connected with these cases, not mentioned in the above paper.

The following is a history of one of the most marked cases: Florence W., female, when two years and three months old, had her first attack of spasmodic croup. It was repeated on the second night. She had been perfectly well the day before, her only previous sickness being summer complaint when eight months old. After the croup she regained her usual health with the exception of a frequent harsh cough. She was brought to me in August, after coughing nearly four months. Her father

had a typical adenoid physiognomy, and a sister (the only other child in the family) had adenoids and occasional attacks of croup.

The patient has a full round face, but a thin, poorly covered body, and when undressed looks quite frail The skin is clear and fair. Over the neck, particularly on the right side, and over the upper chest, are a number of long thick veins. In the neck, anteriorly and posteriorly, in the axillae and groins, are chains of hard and freely movable lymph nodes. The tonsils are very large, but do not interfere with nasal respiration; the circumvallate papillae are very prominent, and the spleen can be felt. Breathing is easy, is not quickened, and there is no change in the voice. There is increased dulness over the upper part of the sternum, none over the back. The respiratory sounds are weaker over the right lung, and much more so posteriorly. The sounds otherwise are clear. A faint venous hum can be heard over the upper part of the sternum that is increased ten-fold by holding back the head. All the other functions of her body are well performed and she has lost but two pounds in these four months of incessant coughing. After six weeks' treatment with creasote the cough was gone, the respiration on the two sides more nearly alike, the venous hum was fainter, the large veins not so distinct, and there was a gain of three pounds.

On the last day of the following April she contracted a bronchitis with a return of the former symptoms. The same treatment relieved all in four weeks after the cure of the bronchitis. Several examinations during the summer did not show any abnormal signs in her chest excepting that at all times there was a faint venous hum with her head thrown back that was no more pronounced than can often be heard with some apparently normal children. Some thickening of the superficial nodes remained. Again in last December there was a return. The cough had been coming on gradually for three weeks without any appearance of a bronchitis or other trouble to cause it. She looked more peaked than during the former attacks and was losing weight. She was thirty-eight inches tall and weighed thirty-one pounds. The circumference of her head was nineteen and a quarter, of her chest nineteen, and of her abdomen twenty inches. Her cough, now well established, was of the same harsh, croupy nature as before, and all the signs detailed above were present. She was given, at an interval of several days, two

injections of tuberculin without reaction following. Treatment was this time kept up for three months, and since she has had bronchitis once and croup once without return of the cough or other symptoms due to the enlarged nodes.

The oldest of the eight children was six and a half years and the youngest seven months old. The general condition, with but one exception, was poor; they were thin and pale, listless, and easily tired. The appetite was variable, the bowels usually regular. Only one, the first in the series, had any fever, and this was not continuous. None were suffering from rickets while under treatment, but four showed evidence of having had the disease. There were two cases in each of two families. Either one or both parents in each case showed they had had rickets, or adenoids, or were below the normal as to health in some particular. The surroundings in six were good and in two only fair. Each child was brought to me on account of a peculiar cough, and this was the prominent symptom in each. The cough was alike in all with but one exception. It was harsh, hoarse and hollow, such as is heard early in membranous croup. There would be from two to eight sharp, short barks, the number of paroxysms varying greatly and occurring with equal frequency day and night. There was no secretion nor evidence of pain or soreness. In one it followed acute bronchitis, in one spasmodic croup and in one frequently recurring attacks of bronchitis. In five no ascertainable exciting cause was found. One child had a whoop added to his hoarse cough at intervals of from two to fifteen hours, but there was never vomiting or expectoration with the whoop, nor signs of lung disease, and it was rarely heard at night.

In only one was there any difficulty in or change of respiration, and this did not in any way resemble an asthmatic attack. This was in the boy, three years old, who had frequent attacks of bronchitis. He had at times to make an appreciable effort to breathe. This was not in any way connected with his attacks of bronchitis or the cough. There was no change in the voice in any case. One had had this cough for nearly nine months, one for four months, and the others for from two to five weeks.

All were treated with small doses, *i.e.*, half drop, three or four times a day, of creasote, with the result that in from four to six weeks the cough ceased. In three it reappeared, and two of these had a third attack; all were promptly relieved again by

creasote. The continuance of the creasote for several weeks had a permanent effect on the nutrition of those children in whom it was continued so long. Prominence of the superficial veins of the upper chest was very evident in every case, to a lesser extent in the neck and of a few venous radicles in the face in half. There was puffiness of the face, particularly under the eyelids, in proportion to the enlargement of the veins. In the severer cases the puffiness remained the same at all times and in the milder ones it varied, often being absent. Dulness over the upper breast bone was present and distinct in three cases, extending a little to each side in one, but no dulness was made out in the back. Weakness of the respiratory sounds on the right side was very noticeable in two cases, to a lesser extent in two others, and no difference in the remainder was heard. In every case there was a loud venous hum over the upper sternum with the head thrown back; in some it could be heard with the head erect, but was intensified with the head back. The diagnosis of enlarged bronchial nodes was based on the character of the cough, the enlarged superficial veins, the venous hum and dulness over the sternum, the swollen face, the weak respiration over one lung, and the absence of physical signs of other disease.

Every child had enlarged cervical nodes, in six there was in addition large axillary nodes, and in five large inguinal nodes. All had large tonsils, two had adenoids that interfered with nasal respiration, the follicles of the tongue were prominent in three cases, in two the thyroid was made very distinct by throwing back the head, and in three the spleen could be felt.

One was given two injections of tuberculin, and two had one dose each. No reaction followed either injection, but the conditions were such as to render the result inconclusive.

It was with considerable hesitation and some doubt as to its correctness the statement was made that the enlarged bronchial nodes in the two published cases were tubercular. Further acquaintance with these two and the still further study of the six other cases leads me to believe the enlargement of these nodes in all was a simple hyperplasia and this a local manifestation of the status lymphaticus. The reasons for believing so are, 1st, The general enlargement of the lymphatic tissue, and 2nd, The condition of the children. A comparison of these cases with other subjects of the lymphatic constitution is difficult owing to the fact that the diagnosis in almost all the cases found in the

literature was made at the autopsy. If this condition consists only in an exaggerated susceptibility of the lymphoid tissue these cases can be classed as subjects of the lymphatic habit. But if, in addition to this susceptibility, there is to be included a hyperplasia of the lymphatic structures generally, with a persistent or hyperplastic thymus, and a hypoplasia of the heart and aorta with or without evidence of pre-existing rickets, then so much cannot be stated so positively.

In some of the reported cases of lymphatism there have been found *post-mortem* all the above; in others a general hyperplasia of the lymphatic organs only; in still others a persistent or enlarged thymus with hypoplasia of the vascular system, with at times changes due to former rickets. In the cases reported in this paper there was hyperplasia of a considerable part of the lymphatic system. In addition to the enlarged bronchial nodes there were present enlarged cervical nodes in all, in six in the axillæ, and in five in the groins. No local cause to account for this was found. All had large, pale tonsils and in four they were very large. Two had adenoids that interfered with breathing. In three the circumvallate papillæ were prominent, in two the thyroid stood out distinctly with the head held back, and in three the spleen was felt. No enlargement of other lymphatic tissue was made out positively. The majority of the nodes in the external groups were about one-fourth inch in diameter, of a nearly uniform size in each group, and were found on both sides of the body alike. They were present when the children were first seen, and for a long time underwent no change whatever, remaining small, hard, separate and painless. This is suggestive of previous enlargement of the bronchial group and also of other internal groups not palpable on account of their situation. The cough that was so quickly and thoroughly established in three of the cases following an acute catarrh, also suggests previous slight enlargements, the onset of the acute process causing a rapid increase to a symptom-producing size. Even had there been no previous enlargement of this group the remarkable growth there must have been in such a short time after the irritation began marks these children as unusually susceptible even when the proneness to lymphatic disturbance in children is considered. In five of the cases no exciting cause was found for the enlarged bronchial nodes. The uniform and stationary enlargement of the cervical groups did not indicate

an extension downward, nor was there intestinal disturbance to indicate an extension upward.

There are no symptoms or signs, so far as I know, upon which to base a positive diagnosis of hyperplasia of the thymus, nor of hypoplasia of the heart and aorta. It is doubtful if an enlarged or persistent thymus can be felt over the top of the sternum or cause dulness under it that can be differentiated. But little more can be said as to hypoplasia of the heart and aorta. This cannot often be made out with any degree of accuracy by physical signs. A congenital smallness of the heart is regarded by Beneke as a cause of general feebleness. Anæmia and an imperfect development of the body with an insufficient growth of heart and arteries have been noticed by others. These children were, with one exception, thin, poorly covered, pale and undersized, and this had always been their condition. The one exception had a good layer of fat, but was not a robust child. Five of them still remain delicate. Efforts to determine the presence or absence of hypoplasia of the heart and aorta were made in four cases. Physical examination of the cardiac region did not give any signs to indicate the presence of this condition. With the same children a comparison of the frequency, force and rhythm of the radial pulse was made with other children of the same age and with others of the same weight. With three of the four the pulse was as a rule quicker and usually weaker, but no difference was found as to irregularity. Ten days ago an opportunity presented to examine the two original cases, a brother and sister. The boy is now seven and the girl four and a half years old. He weighs forty-five and she thirty-seven pounds. He is forty-eight and she forty-one inches tall. The boy's pulse was eighty-eight and the girl's ninety-four when asleep. The boy's pulse was the stronger and the more irregular. He faints easily and is frequently sick while she is very seldom ill. The sister has two or three enlarged submaxillary nodes the size of a navy bean. The brother has enlarged cervical, axillary and inguinal nodes of various sizes (all small) and a mild venous hum. I consider the boy still has the lymphatic habit and the sister has not. These two facts warrant the belief in a small heart or aorta in at least some of these cases such as has been found at autopsy in the subjects of lymphatism.

Heretofore the most important question connected with this condition was the sudden deaths without apparent cause or due to very trivial causes. This and the importance of the clinical recognition of this state I will merely mention, and briefly call your attention to the more recent work of Dr. A. P. Ohlmacher, pathologist to the Ohio Hospital for Epileptics. He had published in the bulletin of the hospital the *post-mortem* results of six cases of epileptics, in four of which this condition was found. His examination of these cases indicated that the lymphatic constitution is associated with and a part of pure epilepsy, *i.e.*, epilepsy "beginning in early life, *grand mal* in type, and negative as far as extensive gross brain changes are concerned."

Dr. Ohlmacher has kindly sent me the proof-sheets of five similar cases, soon to be published, that strengthen the position taken in the first communication. His studies in this direction have progressed so far as to enable him to make the diagnosis of "lymphatic epilepsy" in the living and verify it at the autopsy. In a recent personal communication, he says that while there is not a decidedly pronounced enlargement of the superficial regional lymph nodes in the lymphatic epileptics under his care there is a moderate hyperplasia found in the children above the average.

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DISCUSSION.

DR. RACHFORD.—There is a group of cases that so closely resemble these just described that I think some notice should be taken of it. So similar is the clinical description that I felt, as Dr. West described his cases, that I could scarcely make a differential diagnosis. I have seen four cases this winter presenting these symptoms that were thoroughly relieved by removing the adenoids. Just before leaving home I saw another case operated upon where the diagnosis of lymphatic constitution had been previously made. Two or three of these cases which I followed throughout the winter were characterized by any number of attacks of slight bronchitis with little fever and possibly a little irritation about the throat; but the most troublesome symptom was the cough which was almost constant during the acute attacks. Then for a little while the cough would subside and the child would improve under almost any treatment. One of these children I did not see professionally after

the second day from the operation for adenoids and in one other case the recovery was so prompt that I saw it only two or three times after the operation. I have been inclined to look upon this group of cases as something in the nature of chronic grip. I do not believe the adenoids act alone as a reflex cause of the cough, but that there is something of chronic infection located in the adenoids which from time to time breaks out in new attacks.

DR. CRANDALL.—I quite agree with Dr. Rachford as to the frequency with which we find adenoids in these children with persistent coughs. In March I saw a child who had been coughing all winter. A prominent physician in New York had examined him and thought he found some suspicious signs in the right side of the chest. I found evidences of adenoids and had them and the tonsils operated upon by a specialist, so that it might be thoroughly done. The child was much better for six or seven weeks and the parents were delighted with the change. The child was then seized with grip, and developed one of these attacks of persistent day and night cough which lasted for more than a month. The family was almost worn out by it. I finally decided that I had to deal with the condition that Dr. West has described and I began giving creasote. The child certainly improved, more rapidly, however, when he was sent to the sea-shore where he made a complete recovery. The post cervical and superficial glands about the neck were also much enlarged.

DR. CHAPIN.—The paper reminds me of a number of cases of obscure cough where careful physical examination would show no apparent cause for it and where there were also no adenoids. One particular case of mine in a little girl of about eight years was reported in the *New York Medical Journal* some years ago. One day the mother came to my office saying that the child died the night before after a paroxysm of coughing. I secured an autopsy and found several enlarged bronchial nodes, one of which had broken down and formed an abscess, which was pressing upon the recurrent laryngeal nerve and in that way produced a cough, the cause of which I could not detect by physical signs. I believe there is much more mischief from enlarged bronchial glands than we generally suppose.

A CASE OF SARCOMA OF THE CEREBELLUM.

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The following case came under my supervision in the fall of 1897, and is presented to the Society on account of the rarity of the condition.

E. A., white, female, aged four years, well nourished, and a fair complexion, was taken sick the latter part of June, 1897, the prominent symptoms being high fever and vomiting. At that time she was seen by her physician who prescribed for her and in a week's time she was apparently well. On the 13th of July following she was taken to the country and soon thereafter began to complain of intense pain in the head and under her right arm, frequently causing her to cry out. She would sleep a great deal during the day and would wake apparently much refreshed, when she would play at times for hours before the recurrence of the complaint of pains, which were invariably located in the head and under the right arm. While away from home, a weakness of the legs became manifest, the child frequently staggering and at times falling, her limbs seemingly being unable to bear her weight. During this time she slept well at night and did not complain of pain, the principal suffering being confined to the mornings and afternoons. After a stay of four weeks, the child not improving, she was brought back to the city, when she became very sick with fever and vomiting. She soon improved from this second attack, but the weakness of the legs continued. In the latter part of August she began to be very nervous, being unable to hold anything in her hands, and also showed an inability to sit alone. At this time also she lost control of her bowels and bladder, urinating and defacating apparently without being conscious of it. She was seen at this time by several

physicians who gave an unfavorable prognosis and advised the parents to consult me about her.

This in brief is a condensed statement of the previous history of the case, as communicated to me in a letter from her mother.

At the time of my first visit, I was told that the opinion had been expressed by the physicians who had previously seen her that the child was suffering from tubercular meningitis. After two careful examinations, I expressed the positive opinion that the disease was not tubercular meningitis, and that the symptoms were due to a tumor located in the cerebellum. The examination showed the child to be rather intelligent for her age, and she answered promptly and correctly questions put to her. She seemed well nourished and her digestive organs were apparently in very good condition. The nervous phenomena presented were principally peevishness, frequent complaint of pain in the head and slight rigidity of the lower extremities. The child could stand upon her feet if supported, but could not stand alone. She had the power to throw the feet forward, but invariably each foot would pass in front of the other, that is crossed action. Careful observation was made in this case, but it will suffice to give briefly the progress of the disease to the fatal termination. Some weeks after my attendance, the mother expressed the opinion that the child could not see, whereupon a test confirmed her opinion. At this time Dr. L. H. French, one of our ophthalmologists, made a careful examination but failed to discover anything that would throw light upon the case. At this time also Dr. C. L. Allen, the neurologist, examined the child, but would not express the positive opinion as to the location of the tumor. About the time of the loss of vision, enlargement of the head became noticeable, which continued to increase throughout the disease. Next the legs became crossed and perfectly rigid, so that great force was necessary to abduct or flex them, in attempting either the child would scream with pain. In a few more weeks the arms became rigid, and the same difficulty was experienced in attempting to move them. At no time during my attendance was there any fever, but vomiting at times paroxysmally characterized the attack. From about the first of January until her death, in the latter part of April, the child was frequently attacked with convulsions, at times confined to groups of muscles, at other being general.

The necropsy was made by Dr. D. S. Lamb. The head was very large and every suture in the cranium was widely separated. The brain weighed thirty-nine ounces, showed dilatation of the lateral and third ventricle, so that the brain itself presented a mere shell, being distended by a pale fluid, and the cerebellum was much enlarged, its middle portion being converted into a rather soft tumor which involves also much of each hemisphere, and by extension has involved some portions of both pons and medulla, and has practically obliterated the fourth ventricle. Above the tumor was a broad flat cavity which contained a yellowish fluid and white flocculi. The ventricular dropsy was probably due to pressure on the venæ Galeni. Dr. Walter Reed pronounced this tumor a sarcoma.

1 DUPONT CIRCLE.

CONGENITAL HEART DISEASE; A STUDY OF THIRTY CASES.

BY CHARLES W. TOWNSEND, M.D.,

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The following paper is a brief analysis of thirty cases of congenital malformation or disease of the heart. I am greatly indebted to Dr. W. H. Robey, Jr., who investigated the subsequent history of many of the cases. Most of the blood counts were made by Dr. Robey, a number by Dr. N. B. Potter, and one each by Drs. G. L. West, Capps, and W. C. Howe, to all of whom I wish to express my thanks. The cases were seen chiefly at the Children's Hospital, Boston Lying-in Hospital and Massachusetts General Hospital. Two cases were seen in private practice and one occurred in the practice of Dr. Robey.

The special points which seemed to me of interest in these cases are: First. The duration of life. Second. The amount and character of the cyanosis. Third. The cardiac signs. Fourth. The condition of the blood.

DURATION OF LIFE.—Of the thirty cases nineteen were followed to within the last year. Thirteen of these are known to have died at the ages of three hours, twenty-four hours, seven days, six weeks, three, four, ten and twelve months, two years, two and one-half years, seven and one-half years, nine years, and nine and one-half years. Thus eight or nearly two-thirds of these died under one year of age, and the average age at death was a little less than three years.

Six were living when last seen within a year, their ages being four months, thirteen months, ten and one-half, sixteen, twenty-three and twenty-eight years respectively. The four latter cases are especially interesting from their age, and will be considered later.

The eleven cases that have been lost sight of varied in age from two weeks to seventeen months when last seen. The sexes were equally divided in the thirty cases.

CYANOSIS.—In twenty-five of the cases cyanosis was present at all times; in the remainder, occasionally only, with one exception, where it was absent. This exception is a male two and one-half months old, with a heart enlarged to right and left, a loud, systolic murmur at the apex and a thrill to be felt. It is probable that cyanosis will develop as the infant grows older. In three cases cyanosis was not noticed until the infant was one month old; in one not till three months, in another at six months, in another at ten months, and in one not until fourteen months.

In some the cyanosis appeared as a general blueness, so marked that it at once attracted the attention. In others there was slight duskiness with marked blueness of the fingers and lips. The mucous membrane of the mouth often showed the cyanosis markedly. In some cyanosis was limited to the fingers and lips. In all, anger, crying, or any exertion and cold, increased the cyanosis.

In one case, an infant of six weeks, with widely open ductus arteriosus and hypertrophied right ventricle, found at autopsy, the cyanosis became so intense with the exertion of straining for a movement of the bowels, that it was necessary to anticipate this by an enema.

CARDIAC SIGNS.—In ten, or one-third of the cases, there were no heart murmurs; in one I have no record, and in the remaining nineteen murmurs were present.

The ten who had no heart murmurs were all cyanotic. One of these had other evidence of malformation in extra fingers, club-foot and malformation of the lower jaw. In the remaining nine two autopsies were made; in one there was a very large ductus arteriosus, practically a continuation of the pulmonary artery, and a large foramen ovale; the other was the infant of six weeks whose autopsy is referred to above.

In the single case, where there is no mention in the history of a murmur, the child lived with mark cyanosis but one week, and the autopsy showed a perforation between the ventricles, a very large aorta and a small pulmonary artery.

In the nineteen cases the character and significance of the murmurs were often puzzling, and it is not my intention to discuss them here. In all there was a systolic murmur heard in nearly all over the entire cardiac area, but generally more intense at one point. In eight there was no special point of intensity, three of these showed thrills on palpation. In five the greatest intensity of the murmur was at the base and there were no thrills. In three it was loudest at the apex and accompanied by thrills. In two it was loudest at the ensiform cartilage, one of these having a thrill. In the remaining one there were double blowing murmurs at base and apex and a thrill.

In the new-born infant the foramen ovale and the ductus arteriosus are both open. One would suppose, therefore, that a cardiac murmur might be heard. To determine this point one hundred new-born babies were examined at the Boston Lying-in Hospital, within the first three days of life. No murmurs were to be heard in these cases with one exception. This case showed a soft systolic murmur at the base only. The murmur continued for four days at maximum intensity, then became fainter, and had entirely disappeared by the seventh day. The infant was not vigorous, but showed no cyanosis.

THE CONDITION OF THE BLOOD.—In fourteen cases the red blood corpuscles were counted, and with two exceptions, one a partial one only, were found to be increased in number beyond the normal 5,000,000 in a cubic centimetre. This increase, sometimes very great, seems to be an accompaniment either as cause or effect of cyanosis from any cause. Thus Dr. Capps found, at the Massachusetts General Hospital, in four cases of acquired mitral disease in adults with cyanosis the following condition of the blood: Red blood corpuscles, 5,992,000, 6,012,000, 6,080,000, 5,476,000.

Dr. Richard Cabot has kindly permitted me to refer to two cases of his of cyanosis not congenital, where the increase of red corpuscles were extremely marked.

The first case, a woman of fifty-two years, had had increasing cyanosis for ten years. A blood count by Dr. Cabot showed 10,000,000 red corpuscles. The autopsy showed a normal heart and all the organs markedly congested. Cerebral hemorrhage was the cause of death.

The other case is under observation at the Massachusetts General Hospital. She is fifty-three years old and has been

growing more cyanotic the last five years. Previous to that time there was no cyanosis. There are no murmurs nor enlargement of the heart. A blood count by Dr. Cabot showed 12,000,000 reds.

The only exception to the rule of the increase of red corpuscles in my congenital cardiac cases occurred in the only case where there was no cyanosis, and is therefore not an exception. The blood count by Dr. Robey showed only 3,937,500 reds.

The partial exception to the rule is such a remarkable case that it is worthy reporting in full.

Ida, C., an Italian, now twenty-eight years old, first came under my observation at the Massachusetts General Hospital in 1897. She has been blue from birth; she is not short of breath, does a good day's work and feels well. She is well nourished and developed, but her dusky blue color is very noticeable, being especially marked in her finger nails and lips which are very dark. Her pulse is good, her heart not enlarged and free from murmur, except at times a soft, systolic murmur at the base, which, I believe, is functional and has disappeared under treatment.

Her uterine or reproductive history is most interesting. She began to menstruate at fourteen or fifteen years of age and was generally regular. Two children were born at the eighth month when she was twenty-three and twenty-five years old; both died at or soon after birth. A third child was born in August, 1898, at the Boston Lying-in Hospital. She was markedly cyanotic, but not more so than usual during pregnancy, and she got about without difficulty. The labor was a normal one at full term, and the patient showed no exhaustion, the pulse being 80 before delivery and 82 after. The infant weighed seven pounds six ounces. When last seen a few months ago, the baby was strong and vigorous, with rosy cheeks, in marked contrast to the dusky blue face of the mother. It was breast fed. I know of no other instance in literature of a woman with congenital cyanosis giving birth to children.

The blood of this patient has been counted at five different times; twice it was over the normal 5,632,000 and 5,115,000, the former one month after delivery, the latter when four months pregnant, and three times under normal, 2,856,000, 4,000,000

and 4,528,000 (counts by Potter and Capps). All counted before pregnancy except the 4,000,000 count which was made two weeks before delivery.

The blood counts in the other cases are as follows:

In seven under one year they were:

5,955,555	(Robey).
8,051,111	(Robey).
7,144,400	(Robey).
6,586,640	(Robey).
8,000,000	(Robey).
6,570,000	(Capps).
11,800,000	(W. C. Howe).

In five cases over a year the counts were:

9,951,000	(Potter).
7,592,129	(Robey).
6,577,777	(Robey).
8,595,000	(Potter).
6,000,000	(Potter).

Brief histories of these latter five cases are worth recording.

B. S., a male infant of sixteen months, seen in consultation with Dr. G. L. West, of Newton. Cyanosis was not noticed until the infant was ten months old, when it became very marked on exertion. There was no noticeable enlargement of the heart, but a loud systolic murmur was to be heard at the base. Dr. West found 9,000,000 red corpuscles. Dr. Potter counted the blood some weeks later and found 9,951,000 reds, 11,600 whites, a hemoglobin percentage of 85.

Annie S., seven years old. Blue since birth, at times the cyanosis being very intense. Fingers bulbous. General development fair. Heart slightly enlarged; loud systolic murmurs heard all over the cardiac area, loudest in the third left interspace, not transmitted outside of apex line. Pulmonic second sound not accentuated. Blood count (Robey) 7,592,129. The patient was seen from time to time till her death from increasing lack of compensation at seven and one-half years.

Hazel L., sixteen years old. Has always been blue, especially on exertion. Moderate dyspnœa on exertion. The

heart murmur was first discovered at three years of age. At the age of eight I found a slight hypertrophy of the left ventricle, dulness extending just beyond left mammary line, a distinct thrill over the whole body of the heart, and a loud, purring systolic murmur, loudest in the third left interspace. Pulmonic second sound not accentuated.

At sixteen years of age she was five feet one inch in height, slightly cyanotic, especially the lips and finger nails. The fingers were not bulbous. The precordia slightly bulging. Dulness extends from one finger's breadth to the right of the sternum to 1¼ inches to left of nipple. Thrill and murmur as before, but the murmur is now loudest at the apex. Blood count, 6,577,777 (Robey).

Nellie M., ten and one-half years old. Finger nails and lips blue from birth; general cyanosis first noticed at fourteen months, and the older she grows the more cyanotic she gets; marked dyspnœa on exertion with palpitation.

The patient is well developed, and tall for her age; cyanosis is marked, fingers clubbed. No increase in area of cardiac dulness, apex being in the fifth interspace inside the mammary line. Loud systolic murmur all over the cardiac area, loudest in the third left interspace. Blood count (Potter) reds 8,595,000, whites 6,800, hemoglobin 110 per cent.

Mary G., twenty-three years old. Has always been slightly cyanotic, with shortness of breath and palpitation on exertion. She has menstruated only nine times in all, first at twenty years of age and the last time seven months ago. She is poorly developed and slightly cyanotic. There are no cardiac murmurs nor enlargement to be found. Blood count (Potter) reds, 6,000,000, whites, 6,400, hemoglobin, 80 per cent.

SUMMARY OF THIRTY CASES OF CONGENITAL HEART DISEASE.

I. DURATION OF LIFE.—Of nineteen cases kept under observation thirteen have died at an average age of three years, the youngest being three hours, the oldest nine and one-half years. Of six living cases the youngest is four months, the oldest twenty-eight years.

II. CYANOSIS was present in all cases with one exception.

III. CARDIAC SIGNS were absent in one-third of the cases, two of these coming to autopsy and showing marked cardiac mal-

formation. In two-thirds murmurs were present, generally diffuse and systolic in time, with or without a thrill and loudest either at the base or apex.

IV. BLOOD COUNT.—The number of red corpuscles in the blood was increased in all but one of fourteen cases examined, as is found to be the case in cyanosis from other causes. The exception occurred in the only case devoid of cyanosis. The average red blood count in thirteen cases was 7,573,585 red blood corpuscles per cubic millimetre.

76 MARLBOROUGH STREET.

ACUTE ARTICULAR RHEUMATISM IN INFANTS UNDER ONE YEAR, WITH THE REPORT OF A CASE.

BY D. J. MILTON MILLER, M.D.,

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Acute rheumatic polyarthritis in young infants, and even in children under five years of age, is of infrequent occurrence. C. Rauchfuss,[1] for instance, saw but 2 cases among 2,000 sucklings, and H. Koplik[2] 1 only in 7,000 sick children. Some writers, indeed (Cadet de Gassicourt,[3] A. B. Marfan[4]), look with doubt upon all cases in sucklings, while others (Baginsky,[5] Senator,[6] J. Comby,[7] W. B. Cheadle,[8] H. Roger,[9] A. D'Espine et G. Picot,[10] Ashby and Wright,[11] H. Rehn[12]) regard its occurrence as extremely exceptional. On the other hand, A. Seibert[13] has seen "many cases under twelve months," and Pott[14] 21 instances during the first two years of life.

A critical examination of the published cases in very young infants supports the view of the above observers that, in the majority of instances, syphilis of the epiphyses, tuberculous bone disease, multiple neuritis, pyohæmic arthritis, the polyarthritis accompanying or following the acute infectious diseases, scurvy and even tetany have been mistaken for acute articular rheumatism. This is eminently true of those cases of arthritis reported by the earlier writers as occurring at or shortly after birth, following or accompanying, as so many of them do, blennorrhagic ophthalmia and vulvo-vaginitis, or septic processes in the mother or child. As Marfan[4] remarks, the recognition of gonorrhœal arthritis is of late years, and throws doubt on most of the earlier cases of acute rheumatism in infants, and the same may be said of scurvy and the pyogenic arthritides of sucklings. To Bouchard, Marfan[15] attributes the credit of first isolating clearly genuine rheumatic arthritis from those various pathological states presenting the clinical appearances, but not the nature of

true rheumatism, and to which the former has given the name of "the pseudo-rheumatisms."

But infrequent as acute articular rheumatism is in infancy, there are a sufficient number of well-attested cases on record to show that the rheumatic state does occasionally exhibit itself in very early life in the form in which it is commonly seen in adults, *i.e.*, the arthritic. In atypical forms, however, we believe that rheumatism is quite common not only in childhood but in early infancy. W. B. Cheadle,[16] more than any other writer, has shown that acute rheumatism, as seen in adults, is uncommon in early life, and that, at the latter age, joint inflammation is "only one of many direct and sometimes independent manifestations of the rheumatic state." Thomas Barlow[17] takes practically the same view. The conditions which are regarded in adults as complications often manifest themselves in childhood and infancy as initial phenomena. The pain, perspiration and fever, for instance, are not apt to be marked, while the joint affection may be transient or limited to one joint, or may be absent entirely. Exudative erythema, endo- and pericarditis, pleurisy, tonsillitis, subcutaneous nodules, and, especially in infancy, obscure febrile attacks or nocturnal restlessness, possibly due to muscular pain, may be the only manifestations of the rheumatic state. The acceptance of the view that rheumatism in infancy and childhood is quite frequent is the only way to explain those instances of non-congenital left heart disease occasionally met with in very young children with no history of rheumatism. Schott[18] saw organic heart disease in a child of two years, and Goodheart[19] a babe of two and a-half months acutely ill with cantering action of the heart and a loud systolic bruit heard over the præcordia and in the back. Some years ago the writer had under observation a boy of three years with aortic stenosis and hypertrophy of the heart, the first symptoms of which (palpitation, etc.) the mother had noticed since about the fifteenth month; no history of rheumatism could be elicited.

But it is not with these aberrant forms of rheumatism in childhood that this paper is concerned. They were referred to for the purpose of emphasizing the frequency of the rheumatic state in the very young, and the probability, therefore, of the affection occasionally assuming the more common articular form of later life. Bearing in mind the essential features of the disease

in adults, the following case is presented as a very probable example of genuine acute polyarticular rheumatism in an infant. It is regretted, owing to the fact that the patient was seen at the out-patient department of the Children's Hospital, that the clinical history is not more complete:

E. McD., female, nine months old, was taken sick on April 3, 1898, with fever and painful swelling of the knees. In a few days the left ankle was also attacked. After a week the swelling in the knees subsided and had left the ankle entirely, but a similar condition was noticed in the left wrist. The child had been restless at night and had refused its food. When first seen, on April 23d, twenty days after the onset of the illness, the following condition was noted: The left knee was swollen, slightly reddened and very painful. The right knee was also swollen, but to a less degree, and was not red. There was a slight but painful swelling of the left wrist. No other joints were involved. Temperature, 103°; pulse, 140. The heart sounds were rapid but normal. There was no sweating, nor had the mother ever observed any. The tongue was coated, the bowel movements natural. The lower central incisors were just emerging. A slight "rachitic rosary" could be felt, and there was moderate epiphyseal enlargement. The fontanelle was normal and no eruption could be seen. The infant was pale and anæmic. Since the third month it had been fed upon milk prepared with the peptogenic powder of Fairchild, and had always been well. Salicylate of sodium, 1 gr., and potassium citrate, 3 grs., were ordered every two hours, and the joints were wrapped in a solution of bicarbonate of potassium (10 grs. to the ounce). Two days later the swelling had left the knee, but the right wrist was red, swollen and painful. Slight swelling was still present in the left wrist. (This tendency to pass from joint to joint was characteristic of the whole illness.)

The child had been irritable, and the fever, according to the mother, high. At the time of the visit the temperature was 101⅘°; the pulse 120. A specimen of urine could not be obtained. The salicylate was increased to 2 grains every two hours. On the 27th of April the temperature was but a little above normal and the joints were materially improved. The salicylate was ordered every three hours. By

the 30th of April the infant was very much better. No swelling was perceptible in the joints, but the knee and ankle were still painful on deep pressure. The bowels were natural and the digestion undisturbed. The patient was again seen at the expiration of a week and seemed quite well; no cardiac lesions were discovered. The continuation of the salicylate for a week longer, at eight hour intervals, was advised. The child was visited at its home about three months after its last visit to the dispensary and the heart examined, but no lesion was found. The parents had never had rheumatism, and there was no history of exposure to cold and dampness. In the absence of signs of syphilis or scurvy, or the presence of any focus of suppuration or other infection, the conclusion seems unavoidable that this was a genuine case of acute rheumatic polyarthritis.

In the diagnosis of such an unusual affection as acute articular rheumatism in young infants every other possible cause of the joint affection must be excluded before we can assert that a given case is rheumatic. The various conditions which may be mistaken for acute rheumatic arthritis have already been enumerated on the first page of this paper, and need not be repeated here. A. B. Marfan[4] insists that, in determining the presence of acute rheumatism in infants, the following points must be established: Mobility, proneness to migrate from joint to joint, absence of all tendency to suppuration, frequency of inflammation of cardiac serous membranes, and favorable influence of the salicylates. To these should be added a family history, the presence of tendinous nodules and the absence of such affections as are apt to be attended by inflammation of the joints. In the following attempt to sift from the literature most of the cases of acute articular rheumatism in infants under one year, an endeavor has been made to maintain a more or less close conformity to the majority of these points. In making this inquiry an obstacle was at once met with in the difficulty of determining what is meant by acute rheumatism. If all suppurating cases of multiple arthritis, for instance, are rejected, we must remember that there are many instances of joint inflammation in infants that do not suppurate and yet are not rheumatic (T. Barlow). Also, that all the infectious diseases from chicken-pox to typhoid fever, as well as pneumonia and dysentery, may be attended with an infection of the joints closely resembling acute articular rheuma-

tism. Indeed, acute rheumatism itself is probably a general infection, which may manifest itself without inflammation of the joints. In view of these difficulties, exception may be taken to some of the cases regarded as genuine, while to others, one or more of the doubtful ones may appear to be true instances of the disease. Of course, all cases appearing in the literature as acute articular rheumatism in infants will not be found in the following list. A large number of reports of acute rheumatism were met with the clinical history of which had nothing in common with that disease, and which were, consequently, rejected. It will be seen also that some of the reports are extremely meagre—occasionally the mere statement that the author had seen a case. Here the standing of the reporter was considered in accepting the correctness of the diagnosis.

1. The youngest case is that of F. Earnest Pocock,[20] a babe twelve hours old. The mother, one month before her expected confinement, had rheumatic fever, for which salicylates were given. The rheumatism disappeared with the advent of labor. After the birth of a healthy child the mother's articular symptoms returned. Twelve hours after its birth the child had fever (103.5°), sour perspiration and red and painful swelling of right shoulder and elbow. Salicylates were administered. By the tenth day complete recovery.

2. Schaefer:[21] Child five days old. Mother had acute articular rheumatism in the last days of pregnancy, for which sodium salicylate was given, and from which she suffered for one month after confinement. When five days old, the previously healthy infant had swollen feet and a temperature of 38.7°. The swelling increased, and attacked successively the joints of left forefinger, left hip and small joints of both hands. All symptoms subsided in six weeks. Salicylate was given, but discontinued on account of vomiting.

The present writer is in accord with Jaccoud[22] and G. Singer[23] that these unique cases offer strong evidence of the infectious nature of acute articular rheumatism.

3. Alex. Guthrie:[24] Infant twelve days old. On the fourth day after labor mother had chill, fever and pain, and tenderness in umbilical region and upper abdomen. Relieved by cathartics. Three days later painful swelling of shoulders, wrists and knees. Salicylate gave speedy relief. In five days the babe had fever

and red, hot and swollen left wrist and right knee. Salicylate gave relief, but in six days swelling reappeared in wrists and hands; alkalies substituted for the salicylate; recovery in thirteen days. No history of syphilis in parents.

It is possible that the mother's arthritis was secondary to the symptoms of puerperal infection on the fourth day, and the infant's affection may possibly have been of the same nature; but from the migratory character of the arthritis and the favorable influence of the salicylate and alkalies, it is placed among the acute instances of acute rheumatism.

4. T. M. Rotch:[25] Infant of two weeks. After exposure to draught during a bath, acute inflammation of all joints; movements extremely painful; recovery in four months; cardiac disease followed.

5. C. Mettenheimer:[26] Child not quite six weeks old; breast-fed; living in a damp basement; suddenly seized with fever and painful swelling of both knees and wrists. Recovery in a week under the use of local applications. Mother had just recovered from milk leg.

The observations on case 3 may also be applied to this case.

6. V. P. Zhnkovski:[27] Female, two months old. Mother had had acute rheumatism for some time. After exposure to cold, infant seized suddenly with fever (39.6°), pain, redness and swelling of both ankles and great toes. Salicylate gave relief. Recurrence in a few days in phalangeal joints of hands, wrists, both knees and shoulder joints. Complete recovery in a month. Purpura simplex was present, and a tendinous nodule on left hand. No cardiac disease.

The presence of purpura does not seem sufficient to exclude this case, especially in view of the tendinous nodule on the hand.

7. Karl Basch:[28] Female, thirteen weeks old; breast fed; rickety; acute arthritis of right shoulder and fever (38°). Within ten days left ankle and knee and right elbow successively attacked. Temperature, 38°, 39.3°. Pericarditis on twentieth day. Ten days later pneumonia. Salicylate of sodium administered; death. Autopsy: Clear synovial fluid and hyperæmia of synovial membrane in knee and ankle joints; lesions of pericarditis.

8. A. P. Dass:[29] Male, aged four months. After acute intestinal indigestion for two weeks, suddenly attacked with

fever (103°), and hot, red and swollen knee and ankle joints of both legs. Symptoms subsided in a week under alkaline treatment. No history of syphilis. Illness attributed to exposure to draughts.

9. H. H. Kane:[20] Female, four months old. Good health, except eczema capitis. Right elbow, right knee and ankle swollen, tender and red. Amelioration in nine days under salicylate and opium. Pericarditis (friction and enlarged cardiac dulness) then developed. Great improvement in eight days. Temperature, 104.3°. Three weeks later almost well and no abnormal heart sounds.

10. H. H. Kane:[20] An infant of nine months. No details.

11. Bouchut:[21] Male, of five months. Had otorrhœa. Suddenly fever, with red, painful swelling of ankle and knee joints. By eighth day ankle swelling disappeared, but knee affection remained a month.

This case, notwithstanding the ear affection, is justly regarded as genuine by Rauchfuss[1] and H. Rehn.[12]

12. J. C. Adams:[22] Male, six months old. After exposure to rain had fever (temperature, 102°; pulse, 140), and acute arthritis involving metacarpo-phalangeal joints of both hands and corresponding articulations of feet. Partial retraction of head and tenderness of post-cervical muscles. Bronchitis and otitis externa. Salicylate and quinine. Complete recovery in two weeks.

13. H. D. Chapin:[23] Mentions the case of a girl of six months in whom wrists and backs of hands were involved. No details.

14. M. H. Abelman:[24] Male, aged six months. Painful swelling of the knees. Then small joints of feet, right wrist, left ankle, small joints of hand and left shoulder attacked in succession. Fever and cutaneous hemorrhages. Heart normal. Recovery in twenty days under salicylate.

If peliosis rheumatica is an affection distinct from acute rheumatism, this case should be excluded; but owing to the uncertainty regarding this question, the reporter's view that it is genuine is accepted.

15. H. Koplik:[1] Female, six months old. Breast-fed; pain, heat and redness of joints of left foot, left wrist, small joints of fingers and left elbow. Temperature, 105.5°, 102°; pulse, 180. Profuse perspiration; no eruption; broncho-pneumonia present; ninth day, improvement; eleventh day, scarlatinal eruption

followed by desquamation. Tenderness of joints did not disappear until the eighth week after the onset of the rheumatic affection; recovery. Author does not express opinion as to nature of eruption.

16. T. M. Rotch:[35] Infant of seven months had general acute rheumatism lasting until fifteenth month. Recovery without cardiac complications.

17. J. L. Stäger:[36] Infant of seven months; fever and erythematous eruption followed by hot and swollen ankle joint for two days; convulsion then occurred. On tenth day contraction of cervical muscles with fever and signs of pleurisy. On twentieth day renewed contraction of cervical muscles, and in two days painful swelling of right wrist. Complete recovery by thirtieth day.

The doubt expressed by Cadet de Gassicourt[3] as to the rheumatic nature of this case is to be noted. It is placed in this list because of the migratory character of the joint affection, and because, with the subsidence of the latter, there was inflammation of the spinal arachnoid and pleurisy; it is, however, open to doubt.

18. H. Koplik:[3] Healthy, breast-fed infant, nine months old. Redness, swelling, and heat of all metatarso-phalangeal joints of all toes, followed by involvement of similar joints of hands. Temperature, 102°; pulse, 126. Vomiting, restlessness, and cough; infant anæmic; recovery in eighteen days.

19. R. J. Garden:[36] Male, nine months old. Fever, with red, swollen and tender right ankle. Then successively similar condition of left knee, right ankle and left hand and thumb; no complications; salicin prescribed; recovery in fourteen days. Attributed to frequent bathing in cold water.

20. E. Henoch:[37] Infant, ten months old. Fever, with pain, immobility and swelling of right hand, right elbow, left ankle and knee; broncho-pneumonia and pleurisy; arthritis lasted two or three weeks. For a long time crepitation present in right elbow. Myositis rheumatica of adductors of thigh followed, and persisted for three weeks; whole course, four or five weeks.

21. H. D. Chapin:[38] Healthy male, eleven months old. Parents lived on a canal boat; father had rheumatism. Right elbow swollen and inflamed; next, right knee; later, left side of neck; no cardiac lesions; improvement under sodium salicylate.

22. H. Rehn[38] mentions a case one year old. No details.

23. Austin Flint[39] speaks of a case in an infant of one year. Aortic lesions and hypertrophy of the heart existed at the age of two years.

In addition to the above are the following cases, reported in the literature as genuine instances of acute articular rheumatism, but which, judging from the clinical history, must, in the writer's opinion, be regarded as doubtful. In this list are omitted all suppurative and blennorrhagic cases, such as H. Wiederhofer's[39] case, which followed ophthalmia; Bouchut's[31] four suppurative cases; C. Rauchfuss'[1] two blennorrhagic cases; the case of A. Strümpell,[40] with purulent arthritis; and those of Paasch[41] and G. Crusiz.[42]

24. J. P. Thomas:[43] Infant of three weeks. Mother subject to rheumatism, and father died of rheumatism of the brain. When first seen child had double pneumonia and bronchitis. Three days later left knee and ankle swollen, hot, and painful; perspiration sour; symptoms subsided, but in two days recurred. Salicylate of sodium and acetate of potassium administered; improvement. In a week left elbow and wrist attacked, with rigidity of cervical muscles and retraction of head. Amelioration of all symptoms. On the twenty-fourth day of illness baby became restless and died quite suddenly.

25. J. K. P. Caldwell:[44] Infant of two months. A few days after prolonged exposure to cold, had tenderness on pressure of forearms and hands, and on legs below knees. Temperature, 105°. Constipated and passed uric acid from birth. Sodium salicylate and acetate of potassium given. On eighth day convulsion, opisthotonus and carpo-pedal spasms. Characteristic cushiony appearance of backs of hands and feet. Death; no autopsy.

This seems to be a case of tetany.

26. B. Dozier:[45] Healthy male of nine months. For two nights before onset restless and vomited. Left leg was swollen, red, hot and painful. Knee and hip sensitive. Dover's powder. Next day condition unchanged; salicylic acid prescribed. Following day improvement, but a few hours after physician had received this report infant had sudden difficult breathing and screamed if touched upon chest. Death before his arrival. No autopsy.

27. Dupont:[46] Girl of one year. Breast fed; house damp. No ophthalmia or other infection. Fever and swelling, hot and painful, of whole of back of hand and of metatarso-phalangeal joint of great toe. Swelling persisted. In twelve days symptoms subsided. On fifteenth day cerebral complications: coma, deviation of eyes to the right and choreic movements of limbs. Child succumbed in three days; no autopsy.

Of these 27 cases it will be noted that, in addition to four classed as doubtful, an element of uncertainty attaches to the cases of Stäger, seven months, and Guthrie, twelve days, old, also Zhnkovski's and Abelman's patients, respectively two weeks and six days old, which may be regarded as instances of peliosis rheumatica.

This would leave 19 instances of acute articular rheumatism under one year which may fairly be regarded as genuine. It is of interest, also, that two (H. H. Kane's case at seven months, and Basch's, thirteen weeks old) had pericarditis during the course of the rheumatic affection, while two others (Flint's, one year, and Rotch's, two weeks, old) developed cardiac disease at a later period.

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345 SOUTH EIGHTEENTH STREET.

DISCUSSION.

DR. CRANDALL.—I did not understand what number of cases Dr. Miller regarded as positive. It has seemed to me that these attacks of actual articular rheumatism are somewhat more common in young children than is usually supposed. We know that the ordinary attack in children is subacute in character, but I have seen a number of acute attacks as characteristic as those seen in adults.

DR. MILLER.—I believe I found 19 authentic cases.

DR. JENNINGS.—One case of acute articular rheumatism in a child of seven months has come under my observation and terminated in death. It was only temporarily controlled by salicylates.

DR. KOPLIK.—Since the publication of the first case I ever had I have only seen two cases in my practice. The frequency of these cases or of any cases must vary according to the character of material, and therefore the statistics as to its frequency are very confusing, but I think I am safe in concluding from my own experience that this condition is exceedingly rare. The tests that Dr. Miller has laid down in his paper I believe are very well taken. The last case I saw was in a child of twelve months and the mother was a rheumatic subject.

DR. GRIFFITH.—I feel, also, that so far as my own experience goes that this disease is very uncommon. I have seen but one case in an infant. I want to express my appreciation of Dr. Miller's paper, for those who have written statistical papers know what a work it must have been to go over all the reported cases in order to determine whether they were really cases of acute articular rheumatism. A point that was particularly impressed upon me last year in going over the cases handed in for the scurvy investigation was that so many of them had been at first diagnosed as rheumatism.

DR. CRANDALL.—I have been impressed during the past year with the readiness with which the joint affections of scarlet fever may be mistaken for rheumatism. I have seen two cases in which the diagnosis of scarlet fever was doubtful, but the joint affection was very distinct, and in one case the diagnosis was not made with certainty until desquamation occurred. These joint affections occurring in the course of scarlet fever, I think, as a matter of fact, are not true rheumatism in most cases.

DR. COTTON.—I cannot help wondering how long before the time will come when we will stop talking about rheumatism. If there is anything that we have not any right to name distinctly and positively it is rheumatism; and as we have got rid of "bilious," "dropsy," etc., I think we are coming to the time when we will drop "rheumatism" and perhaps "neuralgia." We are now discussing it in a semi-scientific way, as if we really believed there were such a thing. I should like to see this Society make some effort to eliminate this term.

URTICARIA OF THE MUCOUS MEMBRANES, ESPECIALLY IN CONNECTION WITH ASTHMA.

BY FREDERICK A. PACKARD, M.D.,

Philadelphia.

Our knowledge of urticaria is as yet by no means complete, but it can be said that at least most of its phenomena are due to vaso-motor irregularities. In exactly what way various excitants of the condition act we by no means know, all that can be said being that after the ingestion of certain articles of food usually harmless, after the taking of certain drugs, after the administration of certain serums as prophylactic or curative measures, and after contact with certain substances there occurs in susceptible persons, or in others for the time being in some sensitive condition, a train of phenomena showing its chief manifestations in the skin.

That these phenomena are chiefly vascular is shown by the local appearances, by the rapidity of the formation of the wheals, their equally rapid subsidence, and the complete absence of residual sign of their presence. The true and characteristic elements of the skin can hardly be considered as taking part in the lesions save in a purely subsidiary manner. The immediate cause of the appearance of the wheals is still unexplainable, nor do we know whether the curious local appearances are the result of an attempt at elimination of morbid material or not. If the latter is the explanation the attempt is more clumsy and inefficient than is usual in nature, the excretory organs of the skin seeming to be entirely inactive. If it is not an attempt at elimination we must look upon the wheal as the result of a vaso-motor paresis, a view that is strongly supported by the effects of ordinary irritants and especially by the phenomena of dermographism and factitious urticaria.

There is no very evident reason for the fact that in the vast majority of cases the causes of urticaria produce lesions on the external rather than upon the internal surfaces of the body except for the existence of more constant irritation of the exterior than of the interior surface.

If the mucous membranes are affected physically as is the skin we would expect to get sudden swelling, possibly shifting about, with a sense of irritation corresponding to the itching sensation of external urticaria.

My object in reporting these cases is not to call attention to any new clinical fact, but to suggest the possible frequency of this condition of internal urticaria as an explanation of certain cases otherwise difficult to understand; such, for instance, as the so-called "stomach cough," and "sore throat of indigestion."

Before proceeding with an account of the cases that have more particularly called my attention to this subject, I wish to briefly refer to what seems to me a rather interesting observation. As a boy I had a friend who at one time would almost invariably break out with a startling crop of hives upon the occasion of his crossing a certain bridge spanning the Schuylkill River. This I myself witnessed repeatedly. Some years later I met a man who also suffered in crossing the same bridge, but in his case his discomfort came from difficulty in breathing. Whether this was merely a coincidence, and whether these symptoms were due to the aroma from the neighboring gasworks, or to lime-dust that was apt to pervade the atmosphere at that place, I do not know.

During the past winter I had under my care a boy, aged eleven years, because of two attacks of bronchitis, to which he was subject. Just after the last of these attacks he went to the Hot Springs of Virginia for a short time. While there he had an attack of indigestion of considerable severity. Partly because of this he was brought home and I was asked to see him upon his return, on the morning of January 6th. I found that he had had two vomiting attacks upon the preceding day, but was otherwise merely suffering from slight malaise and loss of appetite. His temperature was normal, pulse quiet, his chest perfectly clear from any abnormal sign, but his tongue thickly coated with a white fur. I restricted his diet and gave him small doses of calomel and soda.

That evening I was hurriedly summoned to see him at eleven o'clock. I learned that he had been quite comfortable through the day but had vomited once in the evening. He went to bed at eight o'clock, his temperature being at that time 100.6°. Suddenly he began to cough violently and to be much oppressed in his breathing. This continued with varying severity until shortly before I was sent for, when his oppression became decidedly more severe. I found him with flushed face, slightly dusky lips, and rapid respiration. The chest was rather hyper-resonant at all parts and full of sibilant and sonorous râles. His temperature was 101.4°. I was rather puzzled by this sudden and unprecedented attack of dyspnœa, but the explanation was clear upon my morning visit, for I then learned that at three o'clock in the morning he suddenly complained of severe itching over various parts of the body, and at the same time the cough and dyspnœa abruptly stopped. His breathing through the early morning was unnatural but manifestly from nasal obstruction, which came on earlier in the night with frequent sneezing but no secretion. When I saw him in the morning his face was swollen from a free crop of hives, the lips being much affected. Scattered over the whole surface of the scalp, trunk, and extremities were many typical wheals. The tongue was less coated than on the preceding day, the temperature was 99.4°, and the chest absolutely normal. I saw him again in the afternoon and found that the hives had been very troublesome during the whole morning, but that at 3.30 P.M., the itching quickly diminished, while at the same time his dry cough and sense of oppression in the chest had returned, but not to so great an extent as before.

When I saw him again at 6 P.M., he had quite a large number of hives over his surface, including a huge wheal involving the prepuce. The mucous membrane of the mouth and pharynx were of a vivid but blotchy red color and much swollen. Throughout the chest there were many piping dry râles. His temperature had risen to 100.6°. During that night he had a bad spell of coughing with dyspnœa lasting from 11.30 P.M. to a little after 1 A.M., when he went to sleep to awake at 4.30 A.M. with intense itching of the skin. At 10.30 A.M. another severe coughing spell began and lasted for an hour and a half with diminution of the itching during that period. When I saw him at a little after noon he was breathing quietly but was

much bothered by the urticaria of the skin. The temperature was normal and the chest negative except for a few piping râles over the position of the large bronchi. From this time there was no return of the cough or oppression, the case running the ordinary course of a severe acute attack of urticaria. The only relief given to this cough and oppression was that obtained by the use of a steam atomizer with lime water.

By a curious coincidence I saw a similar but less severe case on the afternoon of the day after the attack began in the case above narrated. On January 7th I was asked to go out to Overbrook to see a little boy aged eight years whom I had frequently attended for chronic gastro-enteritis. He had been taken sick during the night of January 4th with a croupy cough without fever or pain on swallowing. This returned on the night of January 5th. On January 6th his mother looked at his throat and found that his tonsils were swollen. On the morning of January 7th his temperature was 101°, and he had much paroxysmal cough. I saw him that afternoon and found him with a temperature of 100.6°, a thickly plastered tongue and some swelling of the tonsils. His chest was entirely free from abnormal sounds.

On the next day the paroxysmal cough continued but examination of the chest revealed no cause for it. On the morning of the 9th, at about 10 o'clock, a crop of raised, round, white spots appeared first on the face but soon spreading over the body and accompanied by intense itching and swelling, redness and burning of the ears. At the same time the cough notably diminished and did not bother him until the rash disappeared in about an hour, when it again became troublesome.

I saw him in the early afternoon, at which time there was no trace of the rash except for one small typical (although not itching) wheal on one eyelid. The tongue was still heavily coated, the tonsils still large and very red, the chest entirely normal on physical examination. From this time there was no further discomfort except for the outcropping of urticaria upon the skin and nasal mucous membranes for a couple of days.

In both of these cases, but especially in the one first related, the alternation between the skin eruption and the trouble with the air-passages was very striking, and their mutual relationship left no doubt in my mind that the cough in both cases and the physical signs in the first were due to the same process

occurring in the air-passages as was at other times visible on the skin.

A far less striking case, and yet one that possibly illustrates the same condition, was that of a nurse at the Philadelphia Hospital whom I saw last winter in two severe attacks of what appeared to be ordinary spasmodic asthma. To these she had been subject from childhood. During her childhood she also had frequent attacks of hives. This coincidence would have but little interest in this connection save for the fact that her attacks when I saw her had been produced by, or at least shortly followed, the eating of oysters, while a previous attack of asthma she remembered having followed in a half hour after eating fish.

Urticaria involving the lips is so frequent as hardly to deserve mention, but in the case of a girl aged thirteen, whom I first saw in the latter part of 1894, and later on many occasions, there have been repeated attacks of urticaria (giant form) involving one or both lips with constant involvement of the mucous membrane of the tongue, cheeks, gums, and throat. After the complete subsidence of all visible manifestations she, after one of these attacks, had continuous hoarseness and sense of deep obstruction to swallowing, persisting for several days, and without any adequate explanation other than the occurrence of swelling of the mucous membrane of the larynx and œsophagus.

It is by no means impossible that some of the gastro-intestinal symptoms present with urticaria indicate not the persistence of the cause of the urticaria but the actual existence of urtiçaria of the mucous membranes of the stomach and bowel. In the literature many cases pointing to that view are to be found.

Involvement of the genito-urinary tract is apparently more rare than is that of other mucous membranes, yet in 1896 I had a case of what I believe to have been this condition in a man who had marked hæmaturia which ceased quite promptly as he became covered with a profuse crop of typical urticaria. He had previously had frequent attacks of hives, but never had had hæmaturia before this occasion.

There is no very evident reason why urticaria should not affect the mucous membranes as well as the skin, its relative infrequency being probably best explained by the irritation of the latter by the clothing and the unwarmed air.

Comparatively little is said in most text-books on skin diseases, and articles upon asthma regarding urticaria of the mucous membranes in general or that of the respiratory tract.

T. McCall Anderson ("A Treatise on Diseases of the Skin," 1887, p. 236) says: "In rare cases urticaria is accompanied by hemorrhage from the stomach, bowels, or urinary passages, probably owing to the mucous membranes being attacked by the eruption and rupture of the capillaries ensuing."

Moriz Kaposi (*Patholgie und Therapie der Hautkrankheiten*, 4th ed., 1893), says that urticaria at the same times as it involves the skin often shows itself in the mouth, throat, pharynx, and epiglottis.

Lasegue, in his "Traité des Angines" (1868, p. 134), devotes a section to guttural urticaria. He says that when the eruption of urticaria begins on the skin it rarely affects the throat, and that the latter is more often first affected when the urticaria is produced by the ingestion of harmful substances.

H. Radcliffe Crocker, in "Diseases of the Skin," speaks of involvement of the air-passages and stomach in cases of urticaria.

Ernst Schwimmer (v. Ziemssen's "Handbook of Diseases of the Skin," 1885, p. 378) says: "In rare cases urticaria also shows itself on the mucous membranes."

Duhring ("Cutaneous Medicine," Part II., p. 285) says: "The occurrence of urticaria upon the mucous membranes must be admitted. It takes the form of an œdema, usually diffuse. The first signs of urticaria in some instances, as is well known, are manifested in connection with the alimentary or the respiratory tract, as evidenced by symptoms of swelling, characterized by nausea and gastric and œsophageal crises, or a sense of suffocation, and other signs of distress. All such symptoms are peculiar in that they are usually sudden, evanescent, or ephemeral."

George Thomas Jackson ("The Ready Reference Handbook of Diseases of the Skin," 1896, p. 549) says: "The mucous membranes are often affected at the same time with the skin; and if the pharynx (*sic*) is attacked there may be suffocative symptoms."

One of the best articles upon urticaria of the mucous membranes is one by Noël Gueneau de Mussy, entitled "Considérations sur les Endermoses ou Affections Herpétiques Internes," *La France Médicale*, February 26, 1879, *et seq.*). I quote the following general statement: "In the mucous regions inacces-

sible to our sight, if the functional troubles of the organs which they carpet alternate with cutaneous affections, this is a strong presumption that they depend upon the pathogenetic condition which produces these affections; if they coincide with them, or if they succeed them, one could still recognize between these two morbid facts an affinity of nature and of origin, and one ought to consider this in the determination of therapeutic indications."

In 1889 M. Crouslé wrote his *Paris Thesis* upon internal urticaria, and has collected therein thirty-three cases, including nine previously unreported. In case eighteen (personally communicated to the author by Fernet), repeated causeless attacks of coryza were apparently closely connected with a later outbreak of urticaria, the latter being subsequently substituted by an attack of asthma.

The tongue may be swollen during an attack of acute external urticaria, as is shown by the cases of Freudenthal (*New York Medical Journal*, December 31, 1898), Jonathan Hutchinson (*Archives of Surgery*, Vol. i., p. 369, 1890), James Hamilton (*The Medical Press and Circular*, November 13, 1895). In the latter case the swelling was so great that incision of the tongue was required.

In Crouslé's fourth case the whole mucous membrane of the mouth and fauces became swollen during an attack of asthma, although no external manifestations of urticaria were present.

Albert Rosenberg (*Die Krankheiten der Mundhöhle, des Rachens und des Kehlkopfes*, 1899) says: "In urticaria there sometimes form wheals upon the mucous membrane of the mouth, throat and epiglottis."

An interesting case of isolated urticaria of the tongue has lately been carefully studied and reported by Goodale and Hewes (*Amer. Jour. Med. Sc.*, April, 1899).

G. Goltz (*Deutsche med. Wochenschrift*, April 24, 1880, p. 225), reports a case of sudden œdema of the velum palati, followed by a sudden attack of angio-neurotic œdema of the forearms.

Landon (*Berlin klin. Wochenschr.*, January 12, 1880, p. 23), records his personal experience with an attack of left-sided involvement of the pharynx shortly followed by angio-neurotic œdema of the extremities.

H. Gaudier (*L'Echo Médical du Nord*, August 8, 1897, p. 363), relates the case of a student of medicine who had eaten a large meal composed in great part of snails. He was waked two hours later by itching and dryness of the mouth, with the feeling of a foreign body in the throat. On feeling his own throat he touched his enlarged palate which he conceived to be a snail that had stuck to his throat and which he endeavored to remove. When seen the mucous membrane of the cheeks, tongue, palate and fauces were intensely swollen, with some swelling of the epiglottis. In this case there was no external urticaria, but the nature of the mucous membrane lesions is decided by the cause of the attack and by their complete disappearance in twenty-four hours.

In the discussion of a paper by Laveran (*Bull. et Mém. de la Soc. Méd. des Hôp.*, 1891, T. viii., p. 346) upon a case of giant urticaria with involvement of the fauces, there were mentioned similar cases by Moutard-Martin, Rendu and Sevestre.

Joseph S. Gibb (*Philadelphia Polyclinic*, August 3, 1895) has reported a case of violent urticaria following free indulgence in strawberries. On the evening of the second day the external lesions became less troublesome, but hoarseness and difficulty in swallowing came on with increasing intensity. On the next day the patient was well.

The case related in *Preussische medicinal Zeitung* of August 20, 1862, is of much interest in connection with the explanation of those curious cases of hoarseness and "croup," following the taking of quinine, such as are occasionally encountered. It concerned a man with malaria who had taken twelve pills of quinine and at once complained of severe itching on the neck, chest, arms and legs, due to the eruption of transient wheals. On the next day the man had a sudden attack of suffocation with laryngeal stridor and aphonia, the urticaria of the skin being still in evidence. All the symptoms rapidly subsided under treatment by warm potash baths and chloroform inhalations.

A somewhat similar case is reported by I. H. King (*Philadelphia Medical Times*, March 1, 1879, p. 251). A woman, aged twenty-two years, had quotidian intermittent fever. She was given a mercurial cathartic and, on the next day, one dose of quinine. The latter was followed in two hours by the appearance of urticaria, great dyspnœa, precordial oppression. The

patient herself had been similarly affected upon a previous occasion, while her father and mother were said to have the same symptoms upon taking the drug.

A case of alarming œdema of the epiglottis or larynx, which diminished upon the outbreak of an urticarial rash upon the skin was reported by J. Madison Taylor in the *Philadelphia Med. Journal*, April 2, 1898, p. 607. The patient had had previous attacks of urticaria of the skin. Cases showing involvement of the larynx have also been reported by Frank Woodbury (*Philadelphia Polyclinic*, February 15, 1896, p. 61), by W. Allan Jamieson ("Diseases of the Skin," 1891, p. 134), and by A. Cayla (*Congrès International de Dermatologie et de Syphiligraphie*, Paris, 1889, p. 780).

A fatal case of angio-neurotic œdema of the larynx is mentioned by Osler (*American Journal of the Medical Sciences*, April, 1888), among a family wherein angio-neurotic œdema was hereditary.

The subject of the mutual relations of asthma and urticaria has received a considerable amount of attention, particularly since Sir Andrew Clark's article entitled "Some Observations on the Theory of Bronchial Asthma, Viewed in the Light of the Pathology of Hay Fever," which appeared in the *American Journal of the Medical Sciences*, of 1886, p. 104, and which was foreshadowed by a discussion in the *British Medical Journal* of 1880. After looking over the literature of the subject none can deny that the eruption of urticaria upon the bronchial mucous membrane is capable of producing attacks of "spasmodic asthma," and that the asthma of hay fever may have its origin in swelling of the mucous membrane, yet it is difficult to follow Sir Andrew Clark so far as to hold that bronchial spasm is not an important and frequent, nay the most frequent, cause of the difficulty of breathing in ordinary spasmodic asthma. In spite of Sir Andrew Clark's strong reasoning, the arguments advanced in support of the theory of bronchial spasm (especially as expounded by Hyde Salter in his work on "Asthma: Its Pathology and Treatment") must be held as valid in regard to the vast majority of asthmatic cases.

In his lectures on "Clinical Medicine" (Vol. ii.) Trousseau says that among the premonitory symptoms of urticaria, there are for some hours or days "general discomfort, headache, horripilation, rigors, precordial oppression, lipothymia, and

more or less difficulty in breathing, which is sometimes so great as to excite the fear that the patient will be suffocated." "It seems as if the morbific matter were formed in such quantity that the different emunctories are scarcely sufficient to eliminate, or that before finding its natural exit, which is by the skin, it goes round—pardon the figure—knocking at every door, thus affecting the nervous system, the organs of respiration, and the organs of digestion." "I have still to call your attention to a circumstance connected with the eruption which was pointed out by Koch, *viz.:* that it may become developed on the inside of the mouth. This observation leads me to ask, whether the chest symptoms of which I have spoken, are not occasioned by an eruption or congestive state of the mucous membrane of the bronchial tubes, analogous to the eruption and congestion seen on the skin. My opinion is that bronchial eruption may occur in urticaria, precisely as in measles." On p. 645 of Vol. i. he relates a case of an asthmatic woman whose attacks of asthma coincided with an eruption of urticaria, the oppression in breathing invariably increasing when the urticaria disappeared.

In 1896 there appeared the *Paris Thesis* by Jean Pierre Emile Delbrel, entitled "Contribution a l'étude de l' Urticaire des Voies Respiratories." His work is based upon twenty-five cases, twenty-three from the literature with two unpublished cases of Braquehaye. His first case occurred in an ataxic woman who was subject to attacks of urticaria upon eating strawberries or mussels. Suddenly after eating three or four fresh mussels she had an attack of suffocation with cough. (Twice previously she had had attacks of cough after eating mussels.) An eruption of urticaria soon appeared and at the same time the respiratory symptoms disappeared. On the next day she was well. His second case occurred in a dyspeptic man. He had an attack of bronchitis for which had been prescribed kermes mineral and syrup of poppy. Fifteen minutes later there occurred a sudden attack of suffocation with paroxysms of cough which lasted for three-quarters of an hour. One hour after the onset of the attack it suddenly ceased upon the appearance of an urticarial eruption. There was no evident cause other than the syrup of poppies. Delbrel's conclusions are that there is such a thing as urticaria of the respiratory mucous membrane, that the same causes may produce urticaria of the skin and of the

mucous membranes, that the eruption of urticaria often begins in the mouth and extends from that part, that bronchitis predisposes to the location of the eruption on the bronchi, that the suffocative attacks may be due in different cases to affection of the larynx, glottis or bronchi.

In the excellent article upon "Asthma," by James F. Goodhart, in *Clifford Allbutt's System of Medicine*, there is a discussion upon the associates of asthma in which there occurs the following sentence: "Another is urticaria, and it is not uninteresting to note that it is sometimes associated or replaces asthma, as a case of asthma produced by contact with cats will show. I have records of three such cases."

In J. L. Milton's article on "Giant Urticaria," in the *Edinburgh Medical Journal* for December, 1876, he relates a case of giant urticaria involving the skin first and later the mouth and throat, and a second that began with great difficulty in breathing, which subsided upon the appearance of wheals on the skin.

Crouslé relates in his *Paris Thesis* (above quoted) seven previously unpublished cases, and one, the original of which could not be obtained by me (Potain's case reported before the Association française pour l'avancement des Sciences, 1883,) where respiratory distress occurred in association with asthma. His first case occurred after the eating of mussels and was relieved at the same time as there occurred an urticaria of the skin. His second case concerned an old case of asthma in which, on one occasion, the disappearance of an eruption of urticaria was promptly followed by a dyspnœal attack. In his third case oppression of breathing occurred while the urticaria of the skin was still in force. In his fourth case attacks of asthma and urticaria replaced each other about twenty times. His fifth patient was suddenly attacked by extreme dyspnœa after eating Normandy sole and mussels. While mechanically stroking the patient's forearm, there was noticed an eruption upon that part. Friction to the whole body produced urticaria of the whole surface with rapid relief of the respiratory trouble. On a previous occasion a similar attack of dyspnœa had been relieved by the appearance of an external urticaria. The sixth case had had on two or three occasions urticaria with intense dyspnœa "like asthmatic attacks" after eating mussels, fish, lobster, etc. In his seventh personal case, sudden causeless attacks of coryza occurred and lasted for a day or two. Later repeated attacks of

urticaria of the skin occurred with oppression upon their disappearance; later still an attack of asthma without urticaria or coryza; and then constant emphysema with attacks of urticaria and asthma. Potain's case had no true asthmatic symptoms, but with an attack of purpuric urticaria there was present some dulness and feeble breathing on the right side posteriorly, with absence of diaphragmatic breathing.

In an interesting article in the *British Medical Journal* of November 21, 1885, upon "Asthma as Related to Diseases of the Skin," L. Duncan Bulkley furnishes some interesting facts. Among 4,300 cases of skin diseases of various kinds 37, or a little less than 1 per cent., had asthma. Of these 37 cases 5 had urticaria. Again, 68 cases of urticaria were seen in the group above mentioned, or, in other words, 7 per cent. of 68 cases of urticaria also had asthma.

In *Gazette Hebdomaddire* of February 18, 1881, there occurs in the abstract of the proceedings of the Societé de Thérapeutique reference by Gueneau de Mussy to a case of asthma following the disappearance of an urticaria; and, in the same discussion, Paul spoke of attacks of dry nervous asthma being possibly due to urticaria of the bronchi.

In the Lettsomian Lectures for 1879 (2d edition, 1885, p. 36), John C. Thorowgood reports the case of a physician who always had an eruption of urticaria whenever he had one of his attacks of catarrhal asthma.

Achille Bouyer (Considérations pratiques sur l'Asthme, p. 23), relates the case of a woman, aged forty-five years, asthmatic for many years, who had a generalized attack of urticaria, for the relief of which she took a cool bath. Two hours later she had an attack of asthma which lasted many hours, and grew less on the next day upon the appearance of a fresh crop of wheals.

Cayla (*Congrés International de Dermatologie et de Syphiligraphie*, Paris, 1889, p. 780), relates the case of a woman, aged sixty-five years, who was suffering from an attack of asthma occurring after having had a generalized urticaria for two days. The asthma came and went through the day, coinciding with violent itching and new wheals. Later gastro-intestinal symptoms occurred, as will be mentioned later.

In *Sitzungsberichte der Niederrhenischen Gesellschaft für Natur—und Heilkunde zu Bonn* (1881, p. 85), Ungar reports a

case of relapsing urticaria with well marked attacks of bronchial asthma. There had been no previous attack of either trouble and both seemed to be excited by going into the cold air and relieved by returning to a warm room. An interesting fact in this case was the occurrence of Charcot-Leyden crystals in the sputum.

Grancher (*Gaz. des Hôpitaux*, June 14, 1884, p. 546), reports a woman, aged nineteen years, who had had for some years a cough following an attack of subacute bronchitis. She had a sudden attack of painful suffocation with sibilant râles and pain in the left chest. Three days after the onset urticaria appeared with prompt subsidence of the respiratory symptoms. The urticaria continued for eight days. Fifteen days after this had ceased she had another suffocation attack with rise of temperature. On the next day the fever fell and a second crop of wheals appeared.

T. Davies Pryce (*Lancet*, May 22, 1886, p. 968), has reported the case of a boy, aged sixteen, upon whom an operation for phimosis had been performed. Two days later the penis was swollen and a poultice was applied. Shortly thereafter itching and tingling were present beneath the poultice. This soon spread to the whole body and an eruption of hives appeared. Simultaneously with the cutaneous eruption, or rather even with the irritation that preceded it, the patient experienced considerable difficulty in respiration, which increased in direct proportion to the amount of the urticarial rash. Hives and asthma persisted for nearly three hours and then disappeared together. Similar attacks recurred during the next two days. In connection with this case much interest attaches to one reported by George C. Kingsbury (*British Medical Journal*, February 7, 1885, p. 278). It concerned a woman, aged thirty-three years, who had a chronic leg ulcer. In spite of her protest that flaxseed poultices caused her to have asthma, such an application was made. Three hours later she had an attack of asthma which subsided upon removal of the poultice. She at the same time had an eruption of urticaria on the back, chest and arms, and a crop of herpes where the poultice had been applied. In Trousseau's "Clinical Medicine" linseed is given as one of the provocatives of asthma. (See note at end of article.)

In Bourdon's article upon "Intermittent Urticaria," in *L'Union Médicale* of November 22, 1866, p. 355, three cases

are related, in the last of which (a man who had never had urticaria), there occurred a sudden sense of heat and swelling of the face and neck accompanied by malaise and anxiety, with oppression to breathing and slight sibilus on expiration. Under the use of ether and sinapisms the malaise and anxiety slowly diminished, while urticaria manifested itself upon the trunk and limbs. Upon the application of cold for the relief of itching semi-syncope recurred, to cease on removal of the cold. On the next day the man was well.

Gilbert Martyn (*British Medical Journal*, June 8, 1895, p. 1265), narrates the case of a woman, aged forty-three, who ate about a dozen mussels for supper. An hour later she had sensations of choking with great difficulty in breathing. At the same time an outbreak of urticaria occurred. On admission to hospital she was cyanosed, with labored breathing, cold extremities, an urticarial rash over the whole body, and typical signs of asthma on auscultation.

In a discussion upon Laveran's paper upon urticaria of the throat, mentioned above, Labbé referred to two cases of asthma soon followed by urticaria.

Guéraud (*Gazette Hebdomadaire de Médecine et de Chirurgie*, July 1, 1881, p. 413), relates the case of a girl, aged nine years, who had had two previous attacks of bronchitis. Suddenly an attack of paroxysmal cough with dyspnœa and malaise appeared. On the next day the lips were violaceous, the respirations were rapid, and sibilant and sonorous râles were present over both lungs with moist râles at the bases and over the bronchi. During the latter part of the third day the dyspnœa ceased. Some bronchitis remained for a little time. Three weeks later a similar attack occurred with respiration rate of 85 and imminent asphyxia. Sibilant and sonorous râles were heard. On the second day of this attack the respirations fell to 40 and there were present moist and dry râles. Gradually through this day the condition improved. The rapid disappearance and the absence of fever rather negatived the existence of inflammatory trouble and congestion of the lungs was, in the reporter's opinion, ruled out by the absence of dulness and bloody expectoration. There was no sign of enlargement of the tracheo-bronchial glands: At almost precisely the same time next year successive eruptions of urticaria appeared. The connection between the attacks of respiratory trouble and the urticaria is not perfectly

convincing, but the case is mentioned, because the reporter was convinced of the association sufficiently to cause him to indicate it in his title.

A case referred to by Robert Willan ("On Cutaneous Diseases," 1809, p. 303), a man with repeated attacks of urticaria in one of which he had trouble with his breathing, may have been an instance of the association of these two conditions.

Sir Wm. Gull (*Guy's Hospital Reports*, 1859, Vol. v., p. 317), mentions in his article upon factitious urticaria, the case of a boy, aged fifteen years, presenting that curious phenomenon and also subject to asthmatic attacks.

V. Alibert (*Gazette Medico-Chirurgicale de Toulouse*, February 1, 1876, p. 27), reports the case of a man aged about thirty years, who had a severe attack of urticaria during the course of which, on two successive nights, there occurred severe attacks of asthma which disappeared after a hot foot-bath.

Mögling (*Berlin. klin. Wochenschr.*, September 27, 1880, p. 557), relates his own experience with urticaria of the skin, apparently preceded by involvement of the mucous membrane of the respiratory passages (burning feeling with cough).

The absorption of hydatid fluid is a well-known cause of urticaria. In this connection I would refer to a case related by Debove (*Bull. et Mem. de la Soc. Med. des Hôpitaux*, 1888), in which a crisis of dyspnœa accompanied urticaria after puncturing hydatid cysts.

Owing to the comparative frequency of urticaria after the injection of diphtheria antitoxin, I have been on the watch for any report of cases of asthma following that procedure. I have seen none, but in the *Lancet* of April 15, 1899, p. 1024, Fitzgerald and Ewart report a case of Malta fever in which urticaria followed the injection of Malta fever antitoxin. A repetition of the injection on the next day was followed by intense urticaria, swollen joints, quick breathing, cough and blood-tinged expectoration. "It seemed that he had a general urticaria, both externally and internally, causing exudation from the various serous membranes." The grave symptoms gradually subsided.

In the two cases coming under my own observation and in the thirty-four cases abstracted from literature the connection between the skin lesion and the respiratory symptoms is quite close. The order of the occurrence is not uniform, and, while in many cases, there seems to be a balancing between the cuta-

neous and respiratory lesions (as was the case quite markedly in my first two patients), yet the two systems are frequently involved at the same time.

A severe attack of pulmonary congestion followed the taking of a bath to relieve urticaria in the case of a boy under the care of Descroizilles (*Rev. mensuelle des Maladies de l'Enfance*, 1885, p. 257).

Octave Sinot relates (*ibid*, p. 218) the case of a child, aged thirty-two months, whom he was attending for bronchitis with disproportionate general symptoms. Upon the occurrence of urticaria on the skin the bronchitis disappeared.

Involvement of the œsophagus in the case of the thirteen-year-old girl spoken of among my own cases seemed quite probable from the sense of deep obstruction to swallowing that persisted after one of her attacks. Such involvement of the œsophagus seemed also to be present in the case of Jonathan Hutchinson's (referred to above), and in a case mentioned by Blachez (*Bull. et Mem. de la Soc. Méd. des Hôpitaux*, 1872, T. ix., 25, p. 270), wherein the swallowing of cold water by a woman with urticaria produced discomfort throughout the whole length of the œsophagus.

Rapin (*loc. cit.*) also reports a case of urticaria with apparent involvement of the œsophagus.

In dealing with urticaria of the gastro-intestinal tract it is necessary for us to be on our guard in order to keep separate the cause and the effect. As has been said by Dubreuille (*Gazette des Hôpitaux*, November 22, 1892), in many cases the digestive symptoms are not the effect but the cause of the urticaria, but that "the urticaria even of alimentary origin is not necessarily preceded by indigestion or intoxication."

Urticaria of the stomach is supposed by Crouslé to have produced the sense of gastric warmth that followed the eating of fish and preceded an outbreak of urticaria upon the following day, in one of the cases narrated in his Thesis. Willan (*loc. cit.*) states (p. 303) that "pain and sickness at the stomach are in general relieved when urticaria appears, but return when it disappears." Such relief was not produced in a case (1) described by Descroizilles, where violent vomiting and diarrhœa preceded and accompanied an eruption of urticaria caused by eating mussels.

De Mussy (*loc. cit.*) relates a case where violent colic without diarrhœa alternated with the appearance of urticaria upon the skin. He later mentions a few cases in which strawberries produced urticaria with vomiting and diarrhœa, the latter symptoms being regarded by him as an evidence of internal urticaria; and then another case with gastric crises ending in what he considers to have been urticaria of the vulva.

Lemonnier (*Annales de Dermatologie et de Syphiligraphie*, 1897. T. viii., p. 280) refers to the case of a man, aged fifty-six years, who had been attacked by chronic migrating giant urticaria about five years before coming under observation. Two years before he was seen he had had vomiting of blood without preceding acute pain in the stomach and without symptoms of dyspepsia. He attributes the hæmatemesis to urticaria of the stomach. That urticaria of the stomach may be one cause of hæmatemesis is shown by a case reported by J. J. Pringle (Transactions of Clinical Society of London, 1885, Vol. xviii., p. 143). It concerned a man, aged fifty-one years, who had recurring attacks of hæmatemesis with urticaria.

There are in the literature a few cases of urticaria involving the external genitals. Involvement of the internal urinary organs would seem to be infrequent. The dividing line between the various forms of angio-neuroses is difficult, and there may be no hard and fast line between the paroxysmal hæmoglobinuria of Raynaud's disease, with its external manifestations, and such a case as the last personal case that I reported. In Lichtheim's article upon "Periodic Hæmoglobinuria" (*Volkmann's Sammlung Klin. Vorträge*, whole number, 134, *innere Medicin*, No. 46) there is related the case of a man, aged forty-three, who had urticaria with the passage of dark red urine about once a month, and always produced by exposure to a low external temperature.

110 SOUTH EIGHTEENTH STREET.

NOTE.—After the reading of the above at the meeting of the American Pediatric Society Dr. F. Forchheimer handed me a brief note referring to the case of a women, aged 30, in whom the application of flax seed poultices produced first asthma, upon the cessation of this urticaria, which again was followed by purpura urticaus. Two years afterward, notwithstanding objections on the part of the patient, poultices were applied again and were followed by the same results except the purpura urticaus.

DISCUSSION.

DR. BLACKADER.—I do not know whether others have noticed that in conditions of chronic bronchitis in children an eruption sometimes appears on the skin and while it remains there seems to be a subsidence of the bronchitis.

DR. WENTWORTH.—I would like to ask about the connection between urticaria and hæmaturia, whether there were any references to it in literature.

DR. MILLER.—Dr. Packard does not speak of any purpuric signs, a condition which sometimes alternates with the eruption of the skin and intestinal colic. The condition is closely allied to the one he describes.

DR. DORNING.—I have not seen an urticaria of the mucous membrane of children, but I have in mind a few cases of adults. In one case, the patient was twenty-six years of age and had three attacks, each one coming on at the dinner table. On one occasion she had eaten grapes, and felt a swelling in the throat which was followed by the urticaria. When I saw her a few days later, I found a slight swelling of the fauces and the arytenoids. She used a saline gargle which gave considerable relief, but that night, notwithstanding large doses of salicylate of sodium, she developed large wheals on the body. Another case was that of a girl of about eighteen, who had urticaria, principally on the forearm, extending up at times to the face. She had one attack of strangling and, though I did not see her, she described it as a swelling in the throat and a choking sensation.

DR. PACKARD.—I found very little reference to hæmaturia in cases of urticaria. One of the best described is that of Lichtheim. In the vast majority of cases they seem to have been attacks of ordinary hives, which begun with symptoms of asthma, and promptly cleared up with the outbreak of hives on the skin.

THE INCREASE OF WEIGHT IN INFANTS FED ARTIFICIALLY.

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In presenting the results of my studies on the increase of weight of artificially or substitute fed infants, I waive the question as to the appropriate sterilization or pasteurization of the milk for future consideration. In this paper I will show the results of substitute feeding with one definite method of modification and preservation of the milk. General statements hitherto given as to the feasibility of methods of heating or modification of infant foods, their advantages and disadvantages, can no longer aid us. We have arrived at a pass when actual study and record of results only can be of value. It is not pretended that the method of modification or heating adopted in feeding these infants was the ideal one. The author of this paper doubts whether any of the methods now in vogue will remain ideal or unchanged in the future. The data of this paper are simply a definite insight into the well-being of a certain number of carefully observed and carefully fed infants.

During the past nine years I have conducted in connection with my Dispensary Clinic a laboratory for the artificial feeding of infants, well and sick. In this way a vast material has been constantly passing under my immediate observation. This material has been utilized as much as possible in such a material, for the study of many vexatious points in infant feeding. For the purposes of the present study infants below the age of nine months were observed and as many collected as would remain under observation for a protracted period. It was soon found that a very limited number could be successfully studied. Monthly inspections and weighings of a hundred infants means much labor, and mothers sometimes rebel against even the weighing of their infants. All infants were below the age of nine months. I have divided my studies as follows:

1. Infants fed from birth, or nearly so, with a modified cow's milk.

2. Infants fed with the breast and cow's milk.

All milk was sterilized at 90-92° (Flügge, Koplik) and then rapidly cooled. The modified milk supplied to these infants of the first and second class was in all cases the same. It was composed of cow's milk diluted with equal parts of distilled water and 6 per cent. of sugar of milk recrystallized added, the so-called Heubner-Hofmann's mixture. Infants below three months receive three ounces of this mixture; above this age an ounce is added to every month until eight ounces are reached, when full whole milk is administered. The number of bottles given to each infant daily varies from seven to eight feedings. To new-born infants below one month the mothers were warned not to adminster the whole three ounces, only an ounce and a half at a feeding. The infants were systematically weighed. In this way infants received the following quantities:

			COW'S MILK.		DAILY QUANTITIES.
24 hours.	1.	7 bottles,	3 ounces	21	mixture, 630
	2.	"			
		8–9 "	3 "	24	750 to 720
	3.	8–9 "	"		750 to 720
	4.	8–9 "	"	32	990 to 960
	5.	7–8 "	"	40	1230 to 1200
	6.	7–8 "	"	42	1290 to 1260
	7.	7–8 "	"	49	1400 to 1370
	8–9.	7–8 "	"	48-56	1680

The Heubner-Hofmann consists of one part of milk, one part of a solution of sugar of milk, 60 g., to a litre of water. This mixture gives approximately the following composition:

Water,	90.57.
Albumen,	1.78.
Fat,	1.85.
Sugar,	5.44.
Ash,	.36.

This mixture is almost identical with that advocated by Soxhlet.

From the above it will be seen that the mixture is poor in fat, and is well diluted; being in use for the past five years I can say it meets the greatest average of cases. No lime water is added under any conditions.

In some of the older children who did not prosper on the Heubner-Hofmann mixture, I have supplied the deficit of fat as follows:

Fat mixture: To the above Heubner mixture we added from a 16 per cent. cream to each 100 parts, enough to bring the fat up to 4 per cent. These cases I include in this paper under a separate heading.

The endeavor has been made to supply a mixture of milk in which the dilution of albuminoids or casein was sufficient to insure its ready assimilation. Only one mixture was supplied to the cases first treated in this paper. This was the mixture mentioned.

We will recall some cardinal points in substitute feeding of infants with modern methods. As far as our absolute knowledge goes, based on the computations of nitrogen waste in the bowel, we cannot as yet say positively that the waste of nitrogen under sterilized milk or pasteurized milk are so apparent and divergent as to enable us to say at a glance that under a certain form of heating or preparation of the food the waste is palpably greater in one form of heated food than another (Bendix-Koplik).

We know that in artificially fed infants in whom cow's milk is used, that relatively larger quantities of milk must be exhibited to the healthy infant than would be necessary in the same infant if fed on mother's milk. This does not at all mean over-feeding with quantities greater than the known stomach capacity. (Cammerer). In sick infants, in fact, fed with cow's milk, the minimal quantities of Biedert have thus far given the best results. Under all conditions the waste under a cow's milk diet is vastly greater than under mother's milk. In fact, Knoepfelmacher has recently shown that a whole and nutritive element of the cow's milk goes through the gut indigested (paracasein and pseudo-nuclein). The phosphorus in cow's milk stools of infants, as showing the above waste, is 16 times as great as in stools of infants of the breast.

Last of all the increase in bodily weight in a substitute or artificially fed baby, cow's milk being used, is very irregular and may be made more so by varying the quantities and class of food exhibited. Cammerer shows first that the infants fed under old methods ten to twenty years ago were as a rule not so well nourished as the infants fed by the later methods of preparation, modification and sterilization. Of 59 tabulated cases by the later methods he finds the following increase of weight daily in grammes:

WEEKS.											
1–2	.2–4	4–8	8–12	12–16	16–20	20–24	24–28	28–32	32–36	36–40	40–52
4	21	21	22	22	25	22	13	16	16	9	12

MONTHS.	WEIGHT.								
1	2	3	4	5	6	7	8	9	10
3810	4430	5090	5800	6550	7180	7650	8140	8600	8880

Of twenty-five children fed in rotation at my laboratory on the methods briefly outlined, I find that at the end of the ninth month the following average weights:

MONTHS.								
1	2	3	4	5	6	7	8	9
3735		5068	5285	5518	7688	7223	8680	9021

My material of accurate monthly weighings includes 30 cases in rotation, and we find the daily increase in these cases as follows:

WEEKS.							
4–8	8–12	12–16	16–20	20–24	24–28	28–32	32–36
32	17.4	23.6	18	14.2	11.8	15.6	15.1

Comparison shows a striking resemblance of figures of daily increase from average computation between the figures of Cammerer's weights and those in my own material. In breast fed infants the figures obtained by Ahlfeld and Cammerer show more regularity than in the cases of bottle fed infants.

	AHLFELD			(Breast).	CAMMERER (Bottle).	KOPLIK (Bottle).
1	18	15	—	31	21	32
2	27	36	37	26	22	17.4
3	27	15	17	24	22	23.6
4	37	29	16	21	25	18.
5	31	—	12	18	22	14.2
6	26			15	13	11.8
7	22			15	16	15.6
8				16	16	15.1
9				9	9	

Ahlfeld finds the figures of Bouchard a little high.

If now we compare the figures obtained in my clinic to those of Cammerer, we must grant that the results in the infants compared are very encouraging, and must lead us to the conclusion that the results in infant feeding where large numbers of infants are averaged and the same methods of general dilution and preparation are employed are much the same in all countries. The differences of daily increase are so slight that it must be that, granted our methods are modern, the discrepancies in some infants will be greater than others. In other words, some infants under great care and avoidance of everything which will tend to make the infant ill and depress the weight, will increase in weight, but not necessarily in such definite ratio as is the case with breast fed infants. Some infants will increase in weight, but in great strides, others by slow increments, but the exact percentage to the body weights is not maintained in arti-

ficially fed infants as in breast fed infants. In my material there were several things to be considered which will tend to depress the results. First the bad hygienic surroundings of the infants (which were all taken from an ambulatory service in the slums); secondly, the tendency of the infants, through some carelessness of the parents to become ill with diarrhœa or other diseases which either necessitated the suspension of milk diet or diminution of the amount of milk until the threatening symptoms had passed. In private practice I have had better results because the care bestowed upon the infants was greater, and the tendency on the part of the parents to experiment was absent. Thus one infant coming under observation at the second month weighing eight pounds, at the end of the ninth month weighed twenty-three and a half pounds. This infant had no illness to interrupt its increase of weight. It received the Heubner-Hofmann-Soxhlet mixture, yet it would not be just to expect that all infants would have such great weight at the end of nine months. Nor was this a case of overfeeding. It would thus seem that study of the average clinical material was rather a better insight into the possibilities of a mode of infant feeding as it shows what can be done with a food in spite of interruptions to the increase of weight by illness and bad hygienic surroundings.

In taking up the infants which were fed upon the breast in part and for the remainder of the deficient nourishment depended upon the bottle they furnish a very interesting study. It is quite safe to predict that an infant, if it has the breast only once, twice or three times in course of the twenty-four hours will thrive on the bottle and thrive much better than on the bottle alone. So uniform is this result that I am convinced through long observation that it is unadvisable to deprive the infant of the breast of the mother no matter how scant the secretion of milk in the breast may be. There seems to be something more in this than mere accident. It is very difficult to decide how much cow's milk to give to such infants in addition to the breast, for it is not practicable always, if at all, to measure the amount of milk secreted by the breast in question, nor is this at all essential. The baby is the best standard. An observant mother and physician will soon find out how much additional milk to give by observing how many nursings the deficient breasts are capable of.

In these cases, however, I never think of advising a mother to get a wet nurse, if her breasts will furnish one or more full nursings throughout the day. We can count on success with the artificial feedings in these cases. There is naturally the feeling in cases where the breast furnishes three or four full nursings in the twenty-four hours, that the mother is apt to overfeed with the bottle. In some infants this is undoubtedly so. In my clinic service I find the model baby, so-called, of the class in which the infant has had the breast and bottle. These infants as a rule do not suffer so much from dyspepsia or diarrhœa as the exclusively bottle fed infant.

The infants show a much greater average weight and daily increase than the baby fed on the bottle alone. In some infants the signs of overfeeding are too apparent and the mothers must be told about its dangers.

The daily increase is found to be the greatest in the 8-12 and 12-16th weeks, times at which the bottle fed baby has difficulty in holding its own.

Taking thirteen cases in rotation fed upon the breast and bottle we find the daily increase in grammes as follows:

			WEEKS.			
8–12	12–16	16–20	20–24	24–28	28–32	32–36
30	24.8	12	19.5	13.7	9.2	11.2

There is apparently here as in the exclusively bottle fed infants no great regularity or law of increase. This is, no doubt, traceable to the natural tendency of the mothers to overfeed. This overfeeding, while it may not be followed by disastrous effects in one case, will in the next be attended by dyspeptic phenomena, which cause a temporary depression in the weight.

The following table shows the average weights of the above thirteen infants at different weeks. The discrepancies in loss were caused by illness of some of the infants, depressing the weights of others.

4–8	8–12	12–16	16–20	20–24	24–28	28–32	32–36
4701	5631	6039	6895	7706	8098	7511	8114

Thus in the 28th to 32nd week indicated by an average of 7511, one infant weighed 8873 and in the 32nd to 36th week one infant weighed 9362, another 8463.

If we compare these averages with those collected by Cammerer for 59 bottle fed infants, we find them in favor of the

breast and bottle even with the very bad hygienic surroundings of my infants. The average weight table of my infants on a mixture of the breast and bottle runs quite close to Cammerer's tables for exclusively breast fed infants:

CAMMERER (Breast).			WEEKS.				
8	12	16	20	24	28	32	36
4825	5555	6215	6815	7265	7740	8150	8530
KOPLIK (Breast and Bottle).							
4701	5631	6039	6895	7706	8098	7511	8114

In the bottle and breast some months show a heavier average than the exclusively breast fed infants. I do not say that physically the babies of my clinic were more robust than babies fed exclusively on the breast, they certainly were ahead in this respect of the baby fed on the bottle alone.

A very instructive, though I admit not conclusive, instance of the good results of a small allowance of breast milk is the case of twins. Both of these infants starting at the 6th week, one with an initial weight of five pounds and one ounce (2511) with a scanty breast allowance at the sixth month weighed 4712; while the sister twin, without any breast allowance starting with an initial weight of 2635, was atrophic at the close of the same period and weighed 3348 grammes. This case of twins, though not a brilliant example of the good results of the breast, still emphasizes the good effects of breast allowance.

66 EAST FIFTY-EIGHTH STREET.

DISCUSSION.

DR. GRIFFITH.—I did not understand how the average weights of the twenty-five infants were obtained.

DR. KOPLIK.—These infants did not continue with me all the time, some dropping out at the end of five months, others remaining the whole nine months. If I took an infant's initial weight and then followed it up for five months I considered that I was justified in using those months in the calculation. Not more than eight did this.

DR. ROTCH.—Were they all fed on the same mixture?

DR. KOPLIK.—They were.

DR. ROTCH.—I think the work of Dr. Koplik has been very interesting, and he deserves a great deal of commendation for carrying out the details. But all his cases were ambulatory,

and, as he says, cannot be compared with cases in the hospital. Unless a scientific work is carried out in a scientific way you meet with obstacles constantly. It seems to me that if you are going to test any feeding you should have the child under supervision as you would in a laboratory; you must either have it in the hospital, or in a private family under the strictest supervision. What struck me at once was that all the children were fed from the same mixture, and very strangely they all did well. If you feed a hundred cases with the same food they will not all do well.

DR. KOPLIK.—I do not contend that all my patients did the same.

DR. ROTCH.—What became of those who were not doing well? If there was a large number that did not do well, I do not see why you should think so favorably of the food. It seems to me that if those babies were doing well, they were getting something else than just what Dr. Koplik thought they were. As they were ambulatory cases of course he could not watch them.

DR. COTTON.—Did I understand Dr. Koplik to say that he changed that mixture by the addition of some milk?

DR. KOPLIK.—Only for very young infants, up to the second month.

DR. MILLER.—May I ask Dr. Koplik why he used that particular mixture? Was it because it is the most practical for the greatest number of infants, or was it a question of economy, and were the infants taking this mixture very constipated? We might suppose so from the low amount of fat.

DR. KOPLIK.—This work is open to the objection that Dr. Rotch has made. I could not tell when the babies went home whether or not the mother gave them an extra bottle of milk. I admit that, because I want to show you the great difficulties in securing definite ideas as to the gain in weight of bottle fed infants. I only brought this forward to show the increase of weight of bottle fed infants under a certain mixture, and not to show that all do well with any one mixture. As to why I used this mixture, I would say that it was simply convenient and applied to most cases. Whether a baby should get this mixture or Liebig's is not the question. The question is what is the normal increase in weight under those circumstances, and is this given infant doing as well as it should?

DR. ROTCH.—That has not been proved. The observations have not determined what a prosperous bottle fed infant is, and it cannot be done with ambulatory babies.

DR. KOPLIK.—I think we could tell better whether this is so if Dr. Rotch would bring some of his cases of increase in weight

so that we could see which method is best. This mixture was one of the first brought to our notice by Heubner. It is convenient and can be prepared by the mother herself. The mothers prefer to take chances on a mixture they can put up themselves instead of a more elaborate mixture. In the future I may change to some other mixture.

DR. ROTCH.—Where shall we get definite data if we work in that way from year to year? We are told that it is well to give this food to babies because it is the most convenient. That is not scientific work and it is not the way to prove that the food is the best. We do not know what our babies are getting and an ambulatory test has no scientific value.

DR. ADAMS.—I would like to ask if a baby in poor hygienic surroundings placed upon that mixture gains in weight as shown by the chart for six months and how much would he expect a baby under favorable circumstances to gain upon the same mixture.

DR. KOPLIK.—I cannot tell. I have not observed enough cases in private practice to make such an estimate.

DR. ADAMS.—I am accustomed to weigh babies every week and I am not satisfied unless they gain at least four ounces a week on substitute feeding.

DR. CRANDALL.—I see one point of objection to the use of such a single formula, namely: The fact that it will be so frequently adopted by practitioners who read the paper, without regard to the special needs of the infants they are feeding. Many physicians have not yet grasped the important idea that *modified milk* means not a special formula, nor even several special formulæ, but *any* formula that is adopted to the special case. They pounce upon a formula because it is easy to use and they unwisely expect that it is going to prove the proper food for every case. I shall not be surprised to soon see physicians writing in the medical journals concerning "Koplik's formula," a result, I know, which he will himself deplore.

DR. MORSE.—It seems to me that the author has simply shown that a certain rather small number of babies, fed on a certain mixture, more or less perfect or imperfect, according to the point of view, have gained certain amounts of weight in a given period of time. If I am not mistaken other babies that did not gain, or lost, on the same food and under the same conditions have not been counted. The results are interesting, but of little value from any other point of view.

DR. WENTWORTH.—I think we have all noted gains following very slight changes in the formulæ. It is a common occurrence for an infant to stop gaining on a given formula and to gain at once when a very slight change is made, either in

the strength of the modified milk or in the quantity. This alone would be sufficient to preclude the adoption of any one formula.

As regards the mother's milk, I think from analyses that have been made it is pretty certain that when the milk becomes scanty it is very apt to be a poor milk and apt to upset the baby. I understood Dr. Koplik to recommend any breast milk, "no matter how scanty," rather than artificial feeding alone. I do not agree with him.

DR. CHAPIN.—Aside from the analyses of these milks we must fall back on clinical experience, and my experience is contrary to that of Dr. Wentworth. While it may be true that the albuminoids are high and the fats are low, still on the whole, it is a better thing to give the baby breast milk with the substitute feeding rather that cut it off entirely.

DR. BLACKADER.—In those instances in which the mother's milk is deficient in quantity, and defective in quality, and the infant's nutrition seriously fails, it is better to stop the mother's milk altogether. But in the majority of cases when we have to deal only with a scanty milk supply in the mother, artificial food in sufficient quantity to supplement the mother's deficiency will, in my experience, be better for the infant than stopping the maternal supply altogether. When we secure cessation of worry, and sufficient sleep for the mother, the quality as well as the quantity of the maternal supply improves. It is no light measure to at once order a wet nurse, or at once put the child wholly upon artificial feeding. The whole subject is a matter for careful judgment; and I should be sorry if this Society were to lay down any absolute rule upon the matter.

DR. WENTWORTH.—I think there has been a misconception of my point. Everybody recognizes the value of mixed feeding. I still maintain that when the milk is very scanty it is usually a bad milk.

DR. FORCHHEIMER.—I think we have drifted away from the discussion of the proper subject. We have to establish first what the normal gain of the child should be, and I take it that that is one of the attempts made by Dr. Koplik. He does not want to compare this food with other foods except to show how much weight can be gained on this food. I confess I should be sorry if in private practice I got such results as Dr. Koplik and others have reported. I agree with him that mixed feeding, provided the breast milk agrees with the child's digestive organs, is to be continued despite the analysis. There is only one analysis that is worth anything, and that is the treatment of the food by the child's stomach. Physiological chemistry is not far enough advanced yet to give us positive data as to the best food for children.

We could not make a better collective investigation, nor one of more importance, than a study of the normal gain of weight in children, whether it be with modified milk, breast milk, or any mixture we choose to use.

DR. ROTCH.—That has been done over and over again and done well.

DR. FORCHHEIMER.—I am not familiar with many large tables of that sort.

DR. KOPLIK.—In closing I want to say that Dr. Forchheimer has been kind enough to state my case for me. This is merely an attempt to get at the well-being of a bottle fed infant and to determine what we ought to expect of a bottle fed infant. I agree that it would be very instructive to the profession to make a collective investigation. I do not advocate this particular mixture, nor give it to every baby.

CONGENITAL CYSTIC KIDNEYS WITH THE REPORT OF A CASE.

BY EDWIN E. GRAHAM, M.D.,

Clinical Professor of Diseases of Children in the Jefferson Medical College;
President of the Philadelphia Pediatric Society.

WITH A

PATHOLOGICAL REPORT.

BY W. M. F. COPLIN, M.D.,

Professor of Pathology in the Jefferson Medical College.

Mrs. J., aged twenty-eight years, family history good, during the past two years she has suffered with migraine, the attacks gradually becoming more frequent, and at present averaging twice a week. Five pregnancies, the first resulting in a miscarriage at three months. The children of the second and third pregnancies are living and healthy, and aged respectively four and one-half, and three and one-third years. The third child presented by the breech, the labor was easy, but the child was still-born at full term. The infant was small, and the bones of the head more freely movable than normal. It is possible that in this case death resulted from some internal congenital defect, perhaps cystic kidneys, as the condition has been reported in two or more children of the same mother.

The here reported case was the result of the last pregnancy. A slight bloody vaginal discharge was noticed twice in the first two months after conception. At the fifth month severe abdominal and lumbar pains were felt, lasting a few hours and requiring the use of morphine; slight pain mostly abdominal continued for several succeeding days. A slight vaginal discharge of blood was again noticed during this period of pain. Labor pains were felt occasionally during the week preceding the birth of the child. The confinement at full term was rapid and easy, and I

was called to see the child by the physician in attendance about twenty minutes after its birth.

The baby was well developed but distinctly cyanotic; it was breathing feebly, the heart's action was distinct. The cyanosis appeared to be more marked than the heart's action and feeble breathing should produce. The body was limp and the child could not be aroused. Slapping, hot and cold spongings, and artificial respiration produced absolutely no effect of any kind, and the child died forty-five minutes after birth.

The autopsy made twenty-four hours after death, showed a normal heart, small areas of lung tissue containing air; liver, spleen, and mesenteric glands normal and both kidneys cystic.

The etiology of these congenital cysts has not as yet been clearly demonstrated. The explanation given by Virchow that the cysts were dilatations of the uriniferous tubules, resulting from a prenatal inflammation, thus leading to retention of secretion of urine and subsequent dilatation, has now been largely abandoned and the theory of Shattock reached after systematic histological studies is generally accepted. Shattock claims the condition is due to a defect in development, and that the mesonephros, or Wolffian body, becomes joined with the kidney or melanephros, and the cysts are formed in remnants of the mesonephros, embedded in the true kidney. The coexistence of other congenital defects, as imperforate anus and cleft palate, seems to favor the view of Shattock. The term "renal adenoma" has been suggested by Goodhart, and is supported by the studies of Bateman and a specimen presented by Edwards.

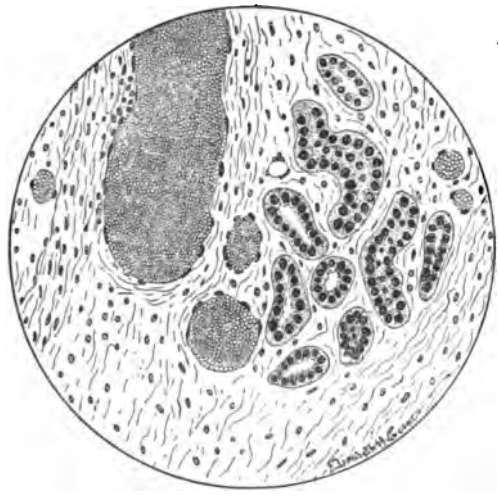


Fig. 1. TUBULAR GLANDS RESEMBLING SWEAT GLANDS.

Most writers describe the finding between the cysts of kidney tissue more or less altered, or fibrous tissue containing

renal tubules and glomeruli. In the cystic kidney of adults, kidney tissue has, as far as I can learn from a study of the subject, always been found; it has not been invariably present in the congenital cystic kidney, and was not demonstrable in my case. Tubular glands resembling closely sweat glands and smaller than normal renal tubules are shown in Fig. 1 and may be the contracted portion of Henle's loop.

The cortical portion of the kidney is where cystic disease is usually first noticed and most extensive. The cysts vary in size from a pigeon's egg to a space hardly larger than the normal uriniferous tubule.

Fig. 2. CYST WALL LINED WITH COLUMNAR EPITHELIUM AND CONTAINING BROKEN DOWN CELLS.

An examination of the cyst contents usually show cholesterin to be present and rarely urea or uric acid. Albumin, blood pigment, triple phosphates and fat are commonly found. Cells undergoing degeneration are seen in the cyst cavities. The cyst

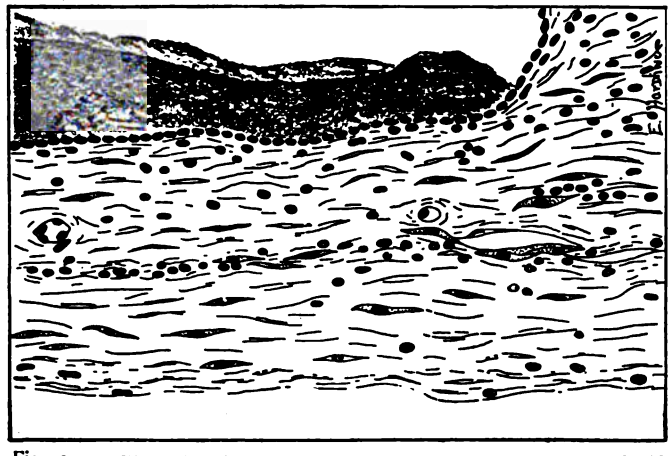


Fig. 3. CYST WALL LINED WITH FLATTENED EPITHELIUM AND CONTAINING BROKEN DOWN CELLS.

fluid in the writer's case had a specific gravity of 1009, was clear and contained albumin, trace of urea, a few cholesterin crystals, a few leucocytes and some broken down cells.

The case here reported shows distinct cyst walls lined by columnar epithelium; in some instances the tall form (Fig. 2), in

others the low columnar type. Other cysts are lined by flattened epithelium, as in Fig. 3. According to Ziegler, Osler, and others the cells lining the cyst wall are usually flattened epithelium.

A distinct connective tissue cyst wall surrounds all cavities, which in a doubtful case might aid in the diagnosis, as in the cystic kidney of adults, as shown by Meigs, the contents of the cyst may be in direct contact with the kidney tissue.

If the kidneys are not so large as to seriously impede labor, and there exists no other malformation incompatible with life,

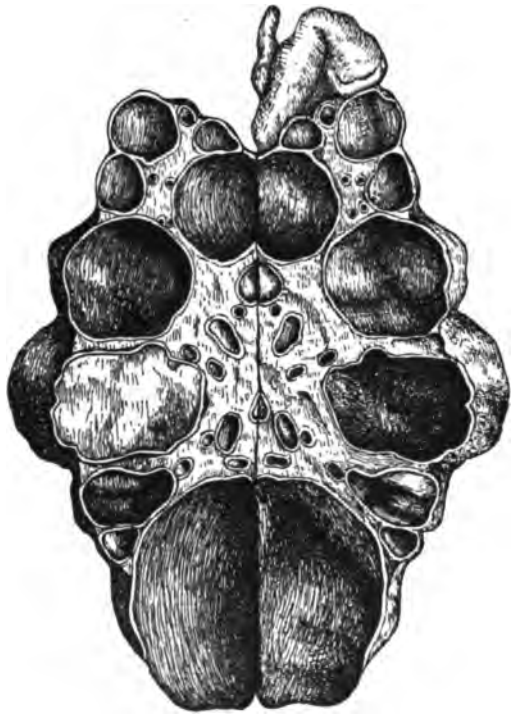


Fig. 4. CONGENITAL CYSTIC KIDNEY LAID OPEN IN LONGEST DIAMETER FROM THE CONVEX SURFACE TO PELVIS.

the child may be born alive; usually, however, death occurs during delivery or soon after birth. It seems to be a matter of common belief, that a certain number of cases live well into middle and advanced life in spite of the congenital cystic condition, and it is claimed the disease may be present for years without producing any serious symptoms or even being suspected.

The size and probably the number of cysts increase with age, gradually producing tumors, often easy of recognition from their large size and possible pressure symptoms. In adults, urine of low specific gravity and excessive quantity is noted, with albumin in small amounts and an absence of casts. Hæmaturia may be occasionally present. The changes in the heart and arterial system resemble those of interstitial nephritis. Uræmic symptoms are not uncommon. Holt, in about eleven hundred consecutive autopsies, reports three cases of kidneys containing cysts. The children died between the seventh and

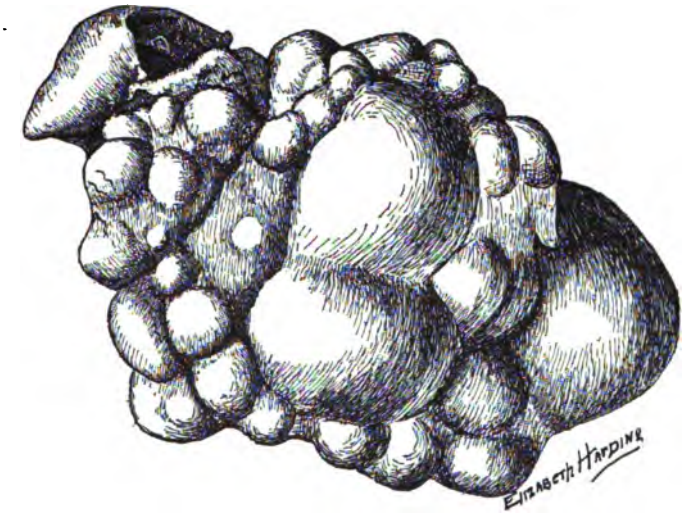


Fig. 5. CONGENITAL CYSTIC KIDNEY.

tenth month, without presenting any renal symptoms. I can report no symptomatology for the disease other than the meagre description given of my case.

The adrenals showed nothing noteworthy, but tissue resembling adrenal gland was found in sections of the kidney.

The lumen of the ureters was distinctly smaller than normal.

The diagnosis is usually a matter of some difficulty, and as the children are usually still-born or die soon after birth, little opportunity is offered for studying the symptomatology. In a suspected case, hydronephrosis, sarcoma of the kidney or retro-

peritoneal glands and echinococcus cyst of the kidney should be considered. The fact that congenital cystic kidney is bilateral, and from a study of cystic disease in adults is usually associated with hypertrophy of the left heart and increased arterial tension and that we have a urine of low specific gravity with albumin, hæmaturia and no casts, would probably enable the diagnosis to be made.

Twelve cases of cystic disease of kidney and liver combined have been reported by Kennedy. In these cases small cysts were found irregularly placed in both organs.

Treatment by drugs offers no hope for cure. Surgical interference is rarely justifiable, as the condition is usually bilateral.

PATHOLOGICAL REPORT.

LEFT KIDNEY.—The organ is not typically kidney-shaped. It measures 10.25 cm. in length, 6.1 cm. in width, 4 cm. in thickness; at one end is what appears to be a normal adrenal. The surface is irregularly bossed by projecting cysts. The largest of these cysts is egg-shaped and measures 3.5 cm. in its longest diameter, 2.75 cm. in its transverse diameter. From this large cyst to a cyst not more than 1 or 2 mm. in size, cysts of all possible intermediate diameters can be recognized. The wall of each cyst is a transparent, thin membrane from which it is impossible to strip any tissue which might correspond to the capsule of the organ. There passes off from what would correspond to the pelvis of the kidney, what is evidently a ureter. It is impossible to say from the specimen presented exactly what the blood supply has been.

The organ is laid open in its longest diameter the incision being made from the convex surface toward what would be the pelvis, passing through eleven (11) cysts. The fluid contained within these cysts is clear and limpid, and has a specific gravity of 1.009. Chemically it contains a trace of albumin and such a small quantity of urea that it is practically impossible to estimate it by the ureaometer. Microscopically it contains a small quantity of cellular detritis, a few leucocytes and a few cholesterin crystals. The walls of the cysts are fairly uniform in thickness, measuring 1 to 2 mm. The inner surface of the cysts is

smooth and regular. The small amount of tissue between the cysts and toward the pelvis of the organ is white in color, resembling fibrous tissue. At some points it cuts with resistance not unlike that of dense, fibrous tissue. At one point absorption of the wall between two cysts has occurred, leaving two projecting septa which partially divide the cavity. Weight of specimen is 69.5 gms.

RIGHT KIDNEY.—This organ is not even kidney-shaped, except in a very general way. Its surface is composed practically entirely of cysts. It measures 8.5 cm. in its longest diameter by 7 cm. by 5.5 cm.

At one end is what appears to be an adrenal. The cysts seen upon the surface present no important difference from those already described as present in the opposite organ. The largest cyst, however, is larger than the largest cyst on the opposite organ, measuring 4.5 cm. by 3.5 cm. The organ was not incised. Weight of the specimen is 87 gms.

Tissue from the ureter, adrenal of left kidney, the walls of a number of cysts, and portions of the connective tissue from that part of the organ which corresponded to the pelvis, were fixed in corrosive sublimate, dehydrated, infiltrated with paraffin, sectioned and stained with hematoxylin and eosin, lithium-carmin and picric acid, carmalum and picric acid, hematoxylin and picric acid, and toluidin blue alone and with eosin.

MORBID HISTOLOGY.—Transverse section of the ureter: The connective tissue wall of the ureter shows little that may be considered normal. One of the most striking things to be noted is its richness in blood-vessels, which are everywhere to be observed in transverse, longitudinal and oblique sections; for the most part the vessels are filled with blood. Blood is also seen diffused through the surrounding lymph spaces of the adjacent connective tissue. Recognizable layers of unstriped muscle fibres are not present, although immediately around the central lumen one finds more or less irregularly distributed, long spindle cells with rod-shaped nuclei, not, however, so grouped as to form a distinct layer in the wall. Between and around this layer of muscle tissue one finds connective tissue cells irregularly interlacing. Just under what appears to be the epithelial lining of the tube a few unstriped fibres are to be recognized; they are not, however, arranged in anything like their proper order.

The epithelium which lines the tube has been detached,

either in the manipulation incident to the preparation of the specimen or was absent during life, and we find only a part of the inner aspect of the tube, covered by epithelial cells. These epithelial cells are extremely irregular in conformation, size and arrangement, if one may call their loose placing an effort at arrangement. They stain faintly, at some places not at all, are extremely granular and not infrequently fragmented. In none of the sections which I have examined is the lumen of the tube regular, being for the most part extremely uneven, the unevenness produced by projections of the wall as, on transverse section, cone-like extensions toward the centre. Such an arrangement is seen in the normal ureter, but in the normal organ they are comparatively uniform. It is not possible in this specimen to recognize a distinct muscular or fibrous coat, and the epithelial layer of the mucous coat bears little resemblance to the normal lining of the tube. Transverse diameter of the ureter is about 2 mm., the lumen does not exceed .1 mm.

Sections of the adrenal show nothing abnormal or worthy of note.

Sections of the pelvis of the kidney: The first thing that strikes one on examination of these sections is their extraordinary richness in blood-vessels. From blood-vessels one or two millimetres in transverse diameter, to capillaries of the smallest size, many intermediate diameters may be noted. Many of these blood-vessels show bulbous enlargements (varicosity); they are practically all distended by blood, the corpuscular elements of which are packed so closely as to preclude easy recognition of the individual elements. Around some of these blood-vessels, areas of rhexis can be recognized and scattered through the adjacent connective tissue one sees not a few red blood cells. Surrounding these blood cells is a richly cellular connective tissue composed of the following elements:

A few long spindle-shaped cells with rod-shaped nuclei, resembling unstriped muscle fibres. Sometimes these are arranged in lines. There is also present an oat-shaped cell, the length of which is about twice the diameter of a leucocyte. Lymphoid cells are present but not abundantly so. Occasionally one notes the presence of an endothelioid cell, these vary in size between 12 and 15, or even 20 micromillimetres.

The long spindle-shaped cell with ovoidal nucleus, the so-

called fibrous tissue cell, is present in abundance. It may be said in a general way that the tissue which composes this part of the organ is fibrous tissue in various stages of evolution, differing, however, from the normal in its extraordinary richness in blood-vessels. Occasionally areas are noted which contain myxoid cells, the areas surround remaining elements of gland tissue. Nerves have not been noted. Occasionally a small cyst may be found in this area, although they are not abundant.

THE CYSTS.—The majority of the cysts are lined by tall columnar epithelium, and in some of them the columnar epithelium is very long, and at points there is the barest suggestion of ciliation. Nowhere, however, can cilia be satisfactorily demonstrated. The epithelial lining is not uniformly of the high columnar type, occasionally a portion of the lining of a cyst wall, or, in other cysts, the entire lining may be of the low columnar type, which at times is so flat that one is tempted to consider it squamous. In some of the cyst cavities the epithelium is desquamated and has fallen toward the centre of the cavity, in which it may be found in all stages of granular and hyaline transformation. Some of these cysts in which desquamation has taken place show what appears to be an attempt at regeneration of the epithelium on the wall. In the larger cysts demonstration of an epithelial covering is not possible; a study, however, of the smaller ones would lead one to believe that in the beginning they have all possessed an epithelial lining.

In the medium-sized cysts, and in the smaller ones, the wall, whether lined by epithelium or not, is composed of developing connective tissue which shows the occasional presence of unstriped muscle cells. Some of the cysts contain a granular detritis, apparently a precipitate of some albuminoid, although at times this substance resembles hyaline or colloid material. Where the cysts approach the surface of the organ, it is impossible to say that the wall shows sufficient differentiation to justify one in believing that the capsule, if such existed, was a distinct part of the tissue.

GLANDULAR ELEMENTS PRESENT.—A careful search of a comparatively large number of sections fails to demonstrate the presence of any characteristically arranged or structurally perfect renal tissue. One finds oblique, transverse and longitudinal sections of tubular glands, which in many areas bear a striking resemblance to sweat glands. The smallest of these tubules are

smaller than the normal tubules of the renal cortex, resembling in size the contracted portion of Henle's loop. Occasionally the tubules show, in a most striking manner, the twisting and convolution so commonly observed in sweat glands. The epithelium which lines them is of the low columnar or cuboidal type with comparatively large nuclei which take the basic dyes intensely. Occasionally a large tubule will be observed which shows more than a single layer of epithelium, resembling the partial stratification seen in the ducts of sweat glands. Practically all of these gland elements show an arrangement upon a membrana propria, although this structure is not equally well developed in all parts. Some of the tubules, whether alone or congregated in masses, are embedded in a matrix of myxoid tissue. This tissue is not rich in cells, containing at most but comparatively few multipoliar or branching cells. From a study of the grandular elements present, and from a close examination of the cysts, one is led to believe that the latter are evolved from the former by the gradual accumulation of fluid in the interior associated with degenerative changes in the epithelium and condensation and absorption of the periglandular connective tissue.

A careful search made in all parts of the kidney fails to reveal the presence of any structure which in the least resembles a Malpighian body.

DIAGNOSIS.—Congenital cystic disease of the kidney.

1713 SPRUCE STREET.

DISCUSSION.

DR. FREEMAN.—These cases of congenital cystic kidney are not particularly rare. Virchow states in his work on tumors that he has seen a number of them. They sometimes reach an enormous size, so as to form an impediment to labor. In a case that I reported last winter the fœtus was only sixteen inches long and the left kidney alone was six inches long. The diaphragm was pushed up to within half an inch of the axillæ. On examination, the kidneys were found to consist of a mass of cysts but in the periphery of the kidney we found a few Malpighian bodies. No tubules were seen. This case presented other deformities, an encephalocele, and six fingers on each hand and six toes on each foot. The cause of the malformation it seems to me was more likely a malarrangement of the cells of the kidney, so that when they secreted the secretion was carried into sacs instead of into tubules.

A CASE OF PORENCEPHALUS.

BY GEO. N. ACKER, A.M., M.D.

C. W., aged four years; male; colored; entered the Children's Hospital, September 17, 1898.

FAMILY HISTORY.—Mother is living and in good health. Father is dead, cause, delirium tremens. No tubercular or syphilitic history obtainable.

PREVIOUS HISTORY.—Labor normal. Was of good size and well formed. Was breast fed until one year of age, and then was fed on regular diet. Soon after birth the mother noticed that the eyes, especially the right one, had a peculiar appearance, and that he did not move his right arm or leg. His head was also markedly inclined to the right side. He has never walked or made any attempt to do so. He has never made an articulate sound. He cries out and makes signs when he is hungry, but is quiet at other times. He has never attempted to feed himself. His bowels have been regular.

PRESENT CONDITION.—Looks dull and stupid; holds his mouth open; nose flat; eyes wide and staring with pronounced internal strabismus on the right side. Head large and well formed with frontal bosses. Body well formed; abdomen protuberant. Lies in bed on back with legs slightly flexed on pelvis, right leg more strongly flexed than left. The right forearm is strongly flexed on arm and cannot be extended. The arm cannot be moved away from the body. He cannot hold anything in the right hand. The left forearm is slightly flexed on the arm. The grip is but slightly impaired in the left hand. There is a noticeable atrophy of the muscles on the right side in both arm and leg. He makes only slight movements with the right side and can use his left side scarcely better, the range of motion in left arm and leg being very limited. The muscles are soft and flabby.

INTEGUMENTARY SYSTEM.—Skin harsh and dry. Does not sweat much. No eruption.

GLANDULAR, OSSEOUS AND URINARY SYSTEMS.—Negative.

CIRCULATORY SYSTEM.—Heart sounds normal. Temperature 101° F. Pulse 112.

RESPIRATORY SYSTEM.—Diminished expansion on right side with diminished breath sounds. Some dry râles throughout both lungs.

DIGESTIVE SYSTEM.—Normal. The appetite is enormous.

NERVOUS SYSTEM.—Sleeps well. Makes no effort to talk. Does not appear to suffer pain. When he is hungry or angry he makes a loud, bellowing sound. There is no twitching of the muscles. The child lies quietly and does not make any voluntary movement. There is slight loss of tactile sensation in the body for he cannot locate irritating articles with exactness. This is much impaired on the right side (arm and leg).

September 19.—The child appears to have some difficulty in swallowing, but an examination of the throat shows no lesion. Voids urine in small amounts but frequently. Has perfect control over the sphincter muscles. Takes food eagerly. One stool in twenty-four hours normal in character.

September 21.—Sleeps well. During the day he lies quietly on his back and makes no attempt to change his position. Has slight difficulty in swallowing.

September 23.—Takes nourishment well. Stools and urine normal in character. Ordered one-fourth of a grain of thyroid extract three times a day.

September 25.—Condition about the same. Thyroid extract increased to one-half a grain. Swallows with less difficulty.

September 29.—The child seems bright at times and appears to recognize different persons. He had not changed since he entered the hospital. He had a fever for a week, but the temperature has been normal for several days.

October 1.—General condition about the same. Child has had frequent profuse sweats the last two days. Cried out frequently during the day without apparent cause, but was quiet and slept well during the night. Takes nourishment well.

October 3.—The child is more quiet and does not sweat much. Thyroid extract increased to one grain and a half three times daily.

October 7.—Pulse weaker and rapid to-day. He seems nervous and irritable and does not like to be moved. Cries out frequently. Sweats still pronounced, but confined principally

BRAIN IN DR. ACKER'S CASE OF PORENCEPHALUS.

to head and neck. Ordered a teaspoonful of whiskey every four hours.

October 9.—The patient is not so nervous. There is a marked change in his power of observation, as he appears to notice his surroundings. If anyone offers to shake hands with him he will put out his left hand. Pulse is stronger and less rapid.

October 10.—Thyroid extract increased to two grains three times daily. Has been sweating profusely during the last twenty-four hours.

October 12.—Nervous symptoms have abated. The sweats are not so profuse. Takes his nourishment well and voids his excreta normally. Makes no effort to move unless spoken to.

October 24.—The child has continued in about the same condition. The thyroid extract was increased to two and one-half grains on the 18th instant. Heart's action is good. Does not cry out except at or near meal time.

October 26.—Child is restless. Cries out frequently. Pulse rapid and weak. Profuse sweats. Thyroid extract reduced to one and a half grains.

October 28.—Since the dose of thyroid extract has been reduced, the nervous symptoms have disappeared and the heart's action has become stronger and more regular.

November 3.—Condition has become worse as he does not take nourishment well and swallows with great difficulty.

November 7.—Patient is weaker. Does not take full amount of nourishment. Cries out frequently as if in pain.

November 9.—Became progressively weaker and died in the evening. Temperature just before death was 107.7° F.

Post-mortem examination made thirty-six hours after death.

GENERAL APPEARANCE.—Body was emaciated. Muscular atrophy marked on right side of body. Head apparently normal in size and shape.

ABDOMINAL CAVITY.—Intestines normal. Stomach slightly enlarged and somewhat distended with gas. Spleen bound to greater curvature of stomach by old adhesions. Spleen was also adherent to end of pancreas. Spleen normal in size and color. No tubercles. Kidneys normal. Liver normal in appearance, adherent to diaphragm by old adhesions throughout its superior surface.

THORACIC CAVITY.—Both lungs crepitant throughout. Right lung adherent by delicate fibrous adhesions to the entire pleural surface with the exception of the diaphragmatic portion. No adhesions in left pleural cavity. Slight emphysematous area along edge of left lung anteriorly. Thymus gland prominent and of a deep red color.

CRANIAL CAVITY.—No inflammatory condition present. On left side there was a large cyst.

Report on brain by Dr. D. S. Lamb.

The brain was somewhat injured about the left temporal lobe when brought to the museum. It has since been bisected nearly in median line, a slight preponderance on the right. The respective weights of right and left hemispheres are 19.5 and 14.5 oz.

The fissuration is quite atypical. The right Sylvian fissure is distinctly marked; the left Sylvian fissure is lost in the porencephalic depression. The Rolandic fissure is unrecognizable in its normal situation, but above, beginning about one inch in front of the normal situation, there is, on the right side, an unusually deep but irregular fissure, and on the left the porencephalic depression. The lower end of each seems to correspond in position to the normal lower end of the Rolandic fissure. If this is the Rolandic fissure, then there is an over-development of the parietal lobes, or perhaps to speak more accurately, an under-development of the frontal lobes. The basal arteries seem to be of normal size. Perhaps if their terminal branches were examined the abnormal development might be explained.

The study of the convolutions is difficult on account of the peculiar fissuration. There is, on the left side, either an absence of the left ascending frontal with progressive absence of the other frontals from above downwards, or there is partial absence of both ascending frontal and parietal and lower frontal. If the former supposition is correct, then there should have been more or less paralysis of motion on the right side of face, arm and leg, with or without loss of sensation, and probably motor aphasia.

The lateral ventricle on the right side appears normal; on the left side communicates directly with the rather funnel-shaped depression mentioned. The third and fourth ventricles are normal. The basal nerves are present and seem normal except left olfactory tract and bulb, and right bulb and part of tract

which were probably disturbed in removal from cranium. The occipital notch on the right side is sharply marked.

This is a typical specimen of true porencephaly for the lesion took place early in fœtal life and resulted in an arrest of development of certain parts of the brain. The defects correspond closely to those parts supplied by the middle cerebral artery and I think was caused by some change in this artery.

I questioned the mother in regard to injuries during the pregnancy, but was informed that everything had progressed normally. The only etiological factor that I could ascertain was alcoholism in the father and possibly syphilis.

The term porencephalus should be limited to such cases as this where the defect in the brain is due to some cause which has occurred before the birth of the child.

913 SIXTEENTH STREET.

REPORT OF CASE OF ANURIA.

BY A. C. COTTON, M.D.,

Chicago.

CLINICAL HISTORY.—Leroy Swedberg was born after a natural labor on the morning of February 28, 1899. The mother of the child was twenty-three years of age, a Swede by birth. Her family history was negative and her personal history excellent. The date of her last menstruation was April 17, 1898. Nothing unusual was noted during the course of her pregnancy.

Analysis of a twenty-four hours' specimen of urine the day before delivery presented the following findings: Amber, slight turbidity, specific gravity, 1026; albumin, 0; sugar, 0.

Microscopical examination: 1. Calcium oxalate crystals. 2. Large amount of amorphous urates.

The baby, a male child, was plump, robust and weighed at birth eight pounds, but its skin did not present that boiled lobster appearance so characteristic of the new-born. It had the appearance as to color rather of a child three weeks of age. Upon examination the child presented no deformities or malformations.

At the end of twenty-four hours, as he had not urinated, a surgical probe was introduced into the urethra and was easily passed into the bladder, there being no obstruction. A condom was then attached to the penis, hot sitz baths were given, also hot fomentations to supra-pubic region and lumbar regions, but with negative results. At the end of forty hours a gum elastic catheter was introduced into the bladder and about 1 cc. of urine spurted out. Bimanual examination proved the bladder to be absolutely empty.

During the first eighty hours the child rested well, nursing every two hours. The rather dry skin gradually assumed a deep, dusky hue and toward the end of the fifth day presented marked cyanosis at times. The temperature ranged from 99° to 103.4° F.

NERVOUS SYMPTOMS.—At the beginning of the fourth day the child began to have convulsions which were tonic in character, beginning in the depressor anguli oris muscles and affecting the

entire body, the respiratory muscles being principally involved. The convulsions, occurring at intervals of ten minutes and lasting one minute, became more frequent and gradually became clonic in character. Just before death they were almost continuous, and during the last twenty-four hours the child was in a deep stupor from which it could not be roused.

RESPIRATORY SYMPTOMS.—Respirations ranged from 40 to 80, quite regular at first, but toward the end became more shallow and irregular. Physical examination of the lungs negative.

CIRCULATORY SYMPTOMS.—Pulse ranged from 160 to 180. Second aortic sound highly accentuated, otherwise negative.

DIGESTIVE SYSTEM.—Tongue slightly furred and brownish-red in color. Appetite good until the third day when he refused to nurse and was fed from a spoon. This method was continued for twenty-four hours when he began to vomit, retaining nothing. The vomitus, at first, consisted of stomach contents, but gradually became fæcal, resembling very much in its character meconium, being very black and tarry. The bowels moved freely until the fifth day, after which they responded only to hot rectal enemata.

Abdominal palpation and percussion gave negative results.

RESUMÉ OF TREATMENT.—External. Hot sitz baths, hot fomentations, supra-pubic and lumbar, hot tub baths, dry heat.

Internal. Infusion of watermelon seeds *ad libitum*. Calomel, tincture of hyoscyamus, fluid extract of triticum repens.

Post-mortem report by Prof. Hektoen, March 4, 1899.

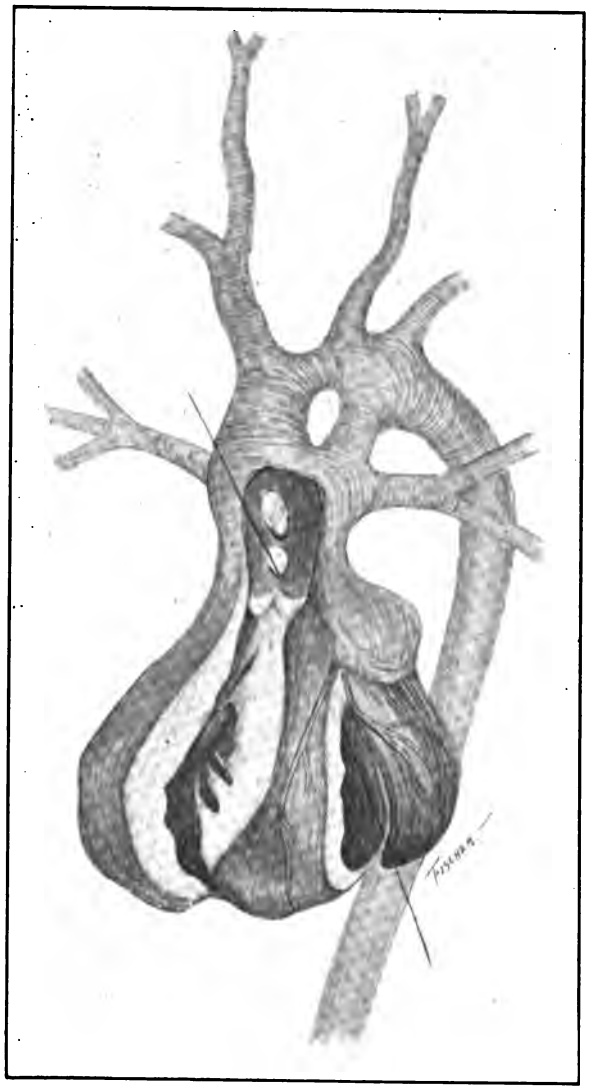
Leroy Swedberg. Age five days, eleven hours.

CLINICAL DIAGNOSIS.—Anuria.

DAY OF DEATH.—March 3, 1899.

ANATOMICAL DIAGNOSIS.—"Morbus cœruleus." Defective septum between pulmonary artery and aorta. Patent ductus arteriosus and foramen ovale. Cyanosis of the skin. Subpleural ecchymosis; fatty cirrhosis of the liver (probably); uric acid infarction of the kidneys; general infection with bacillus mucosus capsulatus.

Well-developed; fairly well nourished male infant; 51 cm. long; weighing 2657 gm. There are no external malformations. The surface of the body, both anteriorly and posteriorly, is bluish-red in color. The umbilical cord is dry and separating at the navel. Abdomen somewhat distended. The abdominal



HEART IN THE CASE OF L. S., SHOWING COMMON STEM FOR AORTA AND PULMONARY ARTERY.

cavity empty, the lining smooth. Diaphragm reaches the fifth right and sixth left rib. The pleural cavities empty and smooth as to lining, the visceral pleura being the seat of many hemorrhagic extravasations. The pericardium is also smooth, the cavity containing a small amount of clear fluid.

The pharynx, mouth, larynx, trachea and œsophagus are normal. The thyroid is of usual size, the thymus rather small. The lungs are fully distended and show many small deeply congested spots throughout the parenchyma. No bronchitis. The heart presents a right ventricle which is much larger than the left, which is situated more behind the right than usual. The walls of the two ventricles are of about the same thickness, but the cavity of the right ventricle is much larger than that of the left. The tricuspid and pulmonary valves are quite normal; the mitral and aortic valves are also well formed and normal, but there is an oval defect about 1½ cm. in its greatest diameter between the pulmonary artery and aorta, so that the beginning of the aorta and the pulmonary artery have a common trunk from which emerge, in the usual places, the right and left pulmonary arteries and the branches of the arch of the aorta. The ductus arteriosus is fully patent and quite large. The part of the aorta distal to this duct is wider than the transverse part proximal to the duct. The foramen ovale is widely open. The veins, pulmonary and cavæ, are quite normal. The ventricular septum is normal. The stomach and intestines are normal. The pancreas is normal. The liver and spleen are congested, the liver being soft and mottled yellow and red. The spleen weighs 10 gm; the liver 110 gm; the adrenals normal, weight 11 gm.

The uro-genital organs are normally situated. The bladder contains a small amount of turbid urine. The mucous membrane immediately around the uretal orifices is swollen and red. There is no dilatation of the ureters or pelves. There is marked uric acid infarction in both kidneys with some congestion of the pyramids. The kidneys weigh 26 gm. The brain and its membranes are normal; weight 38 gm. The lines of ossification are even and regular.

HISTOLOGICAL EXAMINATION.—1. Sections of the heart show only normal structural conditions.

2. The lungs are the seat of an extensive hemorrhagic infarction, the alveoli and bronchioles in places being filled to distension; otherwise no changes.

3. The liver is the seat of a marked passive congestion with fatty infiltration of the liver cells and some recent increase in the periportal connective tissue which is rather cellular.

4. The cortex of the kidneys shows cloudy swelling of the epithelium of the convoluted tubules. In the medulla the uriniferous tubules are crowded full with granular material which stains light blue with hematoxylin. The epithelial lining is intact and the vessels uniformly distended with blood. Sections stained with methylene blue show occasional encapsulated short bacilli here and there in all the organs, especially among the extravasated blood corpuscles and in capillaries of the lungs.

677 JACKSON BOULEVARD.

CLINICAL DIAGNOSIS CHART AND RECORD: A GUIDE TO BEDSIDE DIAGNOSIS FOR USE IN MEDICAL SCHOOLS AND IN PRACTICE.

BY AUGUSTUS CAILLÉ, M.D.,

Professor of Pediatrics, New York Post-Graduate Medical School and Hospital.

The chart which I present for your consideration had its origin in an effort to instruct post-graduate students in bedside diagnosis. It is well known to most teachers in medicine that the majority of young practitioners, and particularly those who have not had the opportunities of hospital experience as internes, find it frequently extremely difficult to make a good clinical diagnosis.

Owing to the great strides which practical and theoretical medicine have made in the past twenty-five years the position of the general practitioner to-day is a peculiar one. He has found it impossible to keep abreast with the rapid progress in medicine and his position is that of Jack-of-all-trades and master of none; any young specialist feels himself his superior in his particular line, and, in our large cities, among the wealthy and rich the general practitioner finds himself little more than master of the ceremonies—the diagnosis and treatment is furnished by the various consultants and carried out by the trained nurse—therefore if the future family practitioner is to regain lost ground, again aspire to and reach that plane in the practice of general medicine which is properly his, and again enjoy the full confidence of his clientele, it must be *through his own individual efforts* by educating himself to become a diagnostician. In view of the complex character which are features of some of the special examinations this may seem an herculean task, but I am convinced that all medical men who are fitted by nature and proper education for their work will in reasonable time be-

come competent diagnosticians and will be capable of formulating precise indications for treatment, provided ample opportunity for laboratory and bedside instruction be offered, and provided that no time be wasted experimenting with thousands of old and new and useless drugs in the endeavor to adapt a complex, cumbersome and largely superfluous materia medica to the various symptoms of disease without one inquiry into the *fons et origo mali.*

If I understand the situation correctly the general practitioner must be

1. Master of physical diagnosis.

2. He must have laboratory training, particularly if he practices far away from laboratory facilities.

3. He must be able to make a local or regional examination, employing such of the methods of specialists which have become general property.

4. He must have a good knowledge of hygiene and dietetics.

In conformity with the views I have expressed, my chart is an attempt to systematize bedside diagnosis and its *modus operandi* is as follows: The student is given a patient and a chart and in following up the symptoms of the case presented he is gradually led through a complete routine clinical examination. After having secured his anamnestic data the student will inform himself as to the temperature, pulse, and respiration of the patient. Diet, stools, vomit, urine, blood are inquired into and investigated. Note will be taken also of the general symptoms indicated at No. 10, and finally, investigation of the special regions or organs involved to which the symptoms apparently point.

All observations are recorded on the last page of the sheet; the inner pages of the sheet contain a number of diagrams for recording lesions in colors.

Finally, the student will state his diagnosis, prognosis, and treatment, and then he will meet his clinical teacher by appointment, who will go over the chart with him, if possible, at the bedside and point out the merits or demerits of his work.

After a case has been disposed of in this way another case

and chart are furnished and after a few weeks of such work it is a pleasure and satisfaction to note with what increased confidence the student approaches a sick bed. The chart may also be used for purposes of recording and preserving accurate records of interesting cases in general practice.

753 MADISON AVENUE.

A CASE OF MENINGITIS DUE TO THE TYPHOID BACILLUS.

(From the Sear's Pathological Laboratory of the Harvard Medical School.)

BY A. H. WENTWORTH, M.D.,

Assistant in Diseases of Children and in Pathology in the Harvard Medical School; Assistant Physician to the Children's Hospital; Senior Assistant Physician to the Infants' Hospital, Boston.

Martha M., four years of age, was under my care for a period of seventeen days in October, 1898. A provisional diagnosis of typhoid fever was made after she had been in the hospital for several days. During this early period some of her symptoms were anomalous, but the subsequent course of the disease was that of a moderately severe typhoid until twenty-four hours before her death.

The clinical history is as follows:

The patient entered the hospital on October 1st. The family history was negative. The parents stated that the child had always been delicate, but had had no previous illnesses. The present illness began six days before she entered the hospital. During this time the symptoms consisted of loss of appetite, headache, fever, and drowsiness. She was said to have been delirious at times. There was no vomiting, retraction or rigidity of the head or tenderness in the neck.

PHYSICAL EXAMINATION, OCTOBER 1ST.—The patient was somewhat emaciated. The skin was pale but not otherwise abnormal. There was considerable apathy from which the patient could be roused without difficulty. The pupils were equal and reacted to light. Pressure over the spinous processes of the cervical vertebræ appeared to cause slight pain, but the patient was so irritable when disturbed that this symptom was doubtful. There was no retraction or rigidity of the head. Passive movements of the head were not painful. The tongue was coated and somewhat dry. The tonsils were hypertrophied. A regular and not excessive cardiac impulse was felt in the fifth left intercostal space inside of the mammary line. There was no enlargement by percussion. The sounds were

clear. The only abnormalities in the lungs were occasional dry and moist râles in the posterior portions. The splenic dulness began at the eighth rib in the left axillary line. The edge of the spleen was palpable during inspiration, about 1½ cm. below the border of the ribs. The liver dulness began in the fifth space in the right mammary line. The edge of the liver was palpable about 2 cm. below the border of the ribs in the same line. The abdomen was normal in appearance. There was no gurgling or tenderness on palpation. The external genitals, joints, and bones were negative. The urine contained a faint trace of albumin; no sugar; specific gravity, 1015; an occasional hyaline cast and a few cells were found in the sediment on microscopic examination. An examination of the blood showed 12,000 leucocytes to the cubic millimetre.

OCTOBER 2D.—The condition remained the same. The child took milk very well. The night-nurse reported that at 7.30 P.M., and again at 12.30 A.M. th child's extremities and body became rigid, the hands clenched and the eyes rolled upwards. The condition lasted for about a minute each time.

OCTOBER 3D.—The condition remained the same as on the two previous days. The eyes were examined by Dr. E. E. Jack and were found to be normal. Lumbar puncture was performed and the spinal fluid was found to be normal. No growth was obtained from the spinal fluid on blood-serum.

OCTOBER 7TH.—The mental condition had improved. The child continued to be irritable but was much less apathetic. She remained awake for the greater part of each day and talked a little with her parents. An examination of the ears showed bulging of the right drum membrane. Paracentesis, performed by Dr. White, was followed by the escape of air which had become confined in the cavity of the tympanum.

OCTOBER 11TH.—Widal's test gave a negative result. The child's general condition remained about the same. The clinical symptoms were those of a moderately severe typhoid.

OCTOBER 15TH.—A second blood examination showed 9,600 leucocytes in a cubic millimetre. Widal's test was repeated and still gave a negative result.

OCTOBER 16TH.—In the afternoon of this day the child became very stupid, and by evening she was unconscious. Tonic and clonic convulsions and Cheyne-Stokes' respiration supervened. The respiration improved after stimulation, but the child

never regained consciousness. On the following day strabismus occurred. There was general rigidity of the muscles of the trunk and extremities, and at intervals clonic spasms occurred. The head was retracted. The pupils were widely dilated and reactionless. This condition persisted until the child's death, which occurred in the afternoon of October 17th. The cerebral symptoms lasted about twenty-four hours. An autopsy could not be obtained.

Lumbar puncture was performed for the second time a few hours before death. The spinal fluid was very turbid and soon showed a deposit of puriform material in the bottom of the test tube. Cover-glass preparations of the sediment were made and stained with Loeffler's methylene blue. Microscopic examination of these preparations showed large numbers of polymorphonuclear leucocytes; some fibrin and a certain number of large phagocytic endothelial cells, some of which contained blood corpuscles and detritis in their protoplasm. Enormous numbers of bacilli were found in every field. No other organisms were found in these preparations. The bacilli were decolorized by Gram's stain. Gabbet's stain for tubercle bacilli was negative. A drop of the exudation was examined without heating or staining and the bacilli were found to be extremely motile. The number of bacilli in a field exceeded that of any twenty-four hour bouillon culture of typhoid bacilli which I have ever seen. A culture on blood-serum was made *at the time of puncture* by allowing the spinal fluid to drop from the needle on to the serum. After twenty-four hours in the thermostat the surface of the serum was covered with a growth of fine colonies. Cover-glass preparations from the growth and from the water of condensation showed motile bacilli similar in all respects to the bacilli found in the cover-glass preparations made from the spinal fluid. No other organisms were found.

TRANSPLANT ON AGAR.—After twenty-four hours the surface was covered with a thin, pearly film.

LITMUS-BOUILLON.—After twenty-four hours the fluid was bluish-red. The litmus color persisted in the sediment in the bottom of the test tube.

FLUORESCEIN TEST.—(½ of 1 per cent. saturated alcoholic solution of fluorescein in bouillon.) The fluorescent appearance persisted after three days.

POTATO.—The surface of the potato presented a wet and glistening appearance without apparent growth after two days.

GELATINE.—A "stab" culture produced no liquefaction or gas formation. After forty-eight hours there was only a slight growth outward along the course of the "stab."

DEXTROSE-BOUILLON.—(1 per cent.) There was no production of gas after several days.

INDOL TEST.—(1 cc. of a .02 solution of potassium nitrite added to a bouillon culture, followed by the addition of a few drops of sulphuric acid.) There was no formation of indol.

SERUM TEST.—Specimens of blood were taken from two typhoid patients. The blood from both patients had shown previously a positive reaction to Widal's test.

In one case the blood was obtained from the patient in the fifth week of the illness. At this time he was suffering from a relapse and his condition was very critical.

In the other case the blood was taken from the patient in the sixth week of his illness. He had been very ill but at this time he was convalescing.

A bouillon culture was made from the agar culture and kept for twenty-four hours in the thermostat. The bacilli in this culture were small and actively motile. They were not very numerous. A dilution was made of one drop of serum to fifteen drops of the bouillon culture. The drops were measured from a pipette and mixed in small glass vials. The vials were tightly corked afterward to prevent evaporation. Microscopic examinations of each specimen were made every four or five minutes. In the first case the loss of motility was very marked within ten minutes. Clumping took place within twenty-five minutes. There were from five to fifteen bacilli in each clump. Very few single bacilli could be found at this time and these showed only vibratory movements. In the second case there was a marked loss of motility within fifteen minutes. Clumping occurred within thirty minutes. The clumps were somewhat smaller than those of the first case. Only a few isolated bacilli were found and these showed only vibratory movements.

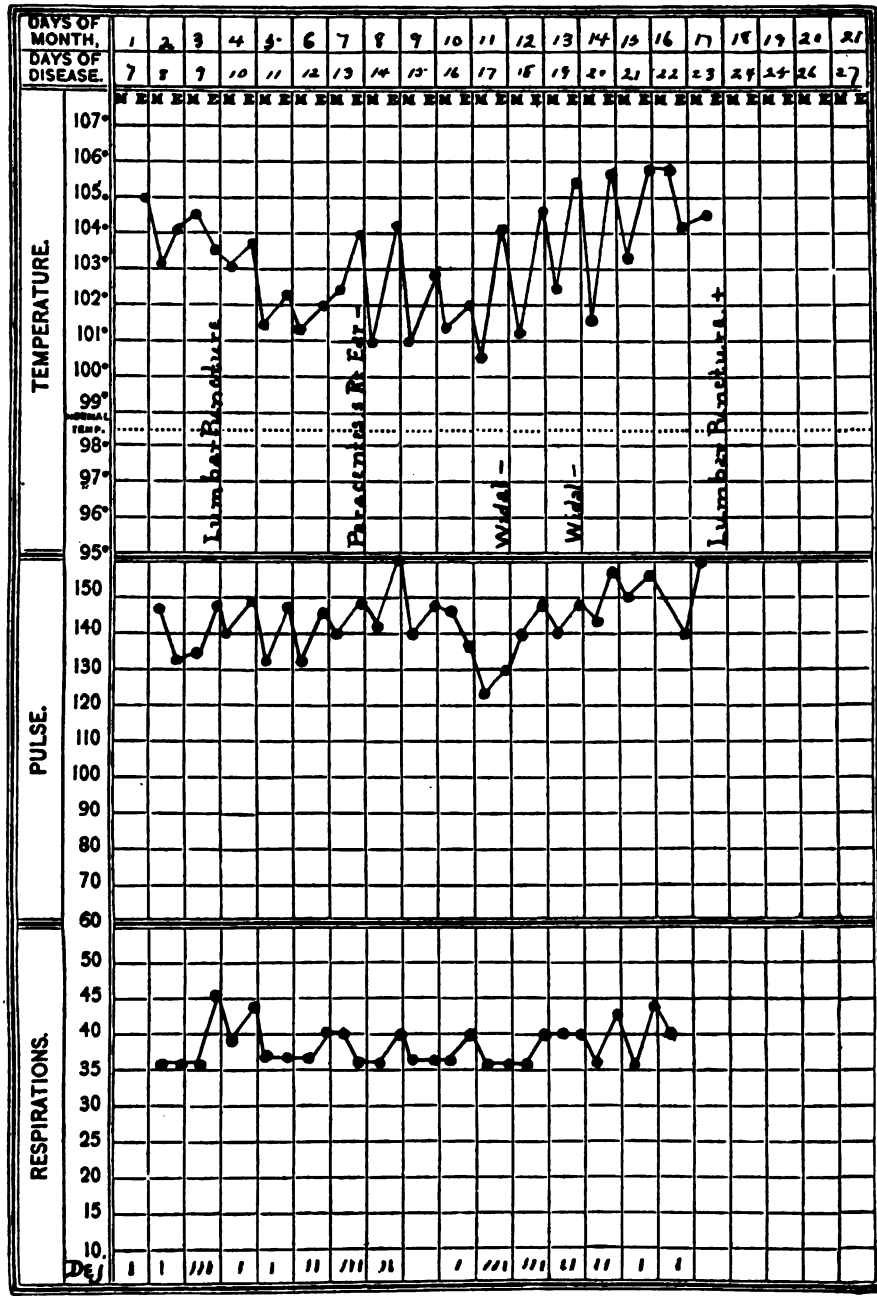
The question as to whether the child had typhoid fever during the three weeks' illness preceding the meningitis cannot be settled. Against its being typhoid fever are the two nega-

tive Widal's tests and the atypical nervous symptoms in the early part of the disease.

For the last two years during the epidemics of typhoid fever I have failed to obtain a positive Widal's test in quite a number of children treated at the Children's Hospital. The cases in which the test failed were either mild or moderately severe cases, judged from a clinical standpoint; or in some cases when the test was performed during the first and second weeks of the disease. In these cases the disease pursued its usual course, so far as the length of time was concerned. The temperature charts were those of typhoid fever. The symptoms and the signs obtained by physical examination were those of typhoid, and in a number of cases other members of the family had typhoid fever at the same time.

The occurrence of atypical nervous symptoms in typhoid fever is not so unusual as to render the diagnosis improbable, provided the subsequent course of the disease is that of typhoid fever. The occurrence of convulsions in the course of an uncomplicated case of typhoid fever is very unusual. The two attacks previously alluded to were observed by one of the night-nurses, and there was considerable uncertainty from her description whether there was loss of consciousness, or if there were typical convulsions. No repetition of the condition was observed and on the following day the child's condition was as it had been previously. The negative result of lumbar puncture and the small number of leucocytes in the blood at this time are both strong evidence against the presence of meningitis at this time. During the succeeding two weeks the child presented the symptoms of a moderately severe typhoid. It is well known that abdominal symptoms may be mild or absent in typhoid fever occurring in childhood. Enemata are required throughout the disease in a large proportion of cases. In my experience abdominal distension is rather uncommon, although the abdominal muscles may be more or less tense in many cases. The tenderness and pain in the abdomen, which are observed so frequently in adults are usually but slightly marked in children.

Baumgarten asserted "that when suppurative processes, apparently due to the typhoid bacillus, occur in the course of typhoid fever they are really due to a mixed infection with the typhoid bacillus and one or more varieties of the pyogenic or-



TEMPERATURE RANGE IN THE CASE OF M. M.

ganisms; and that when the typhoid bacillus is found alone in such cases it means that the other organisms have disappeared." This statement has been disproved by the experiments of Dmochowski and Janowski,* who have shown that the typhoid bacillus always disappears first in such cases.

SUMMARY.

IN FAVOR OF TYPHOID FEVER.—The onset; the duration of the disease; the character of the temperature chart and symptoms; the enlarged spleen; the failure to obtain any evidence of the presence of other diseases by means of physical examination; the negative result of the first lumbar puncture; the small number of leucocytes.

AGAINST TYPHOID FEVER.—The failure of Widal's test; the occurrence of doubtful convulsions in the early period of the disease.

IN FAVOR OF MENINGITIS DUE TO THE TYPHOID BACILLUS.—The presence in the meninges of a purulent exudation which contained enormous numbers of typhoid bacilli; the failure to detect the presence of other organisms by means of careful bacteriological examinations.

Only a limited number of cases of meningitis due to the typhoid bacillus have been reported. Previous to 1890 the methods employed to differentiate the typhoid bacillus from other organisms were so incomplete that the cases have little or no statistical value.

The bibliography which follows refers only to cases in which more or less complete bacteriological examinations were made of the meningeal exudation.

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* Dmochowski and Janowski: Ziegler Beiträge zur Path. Anatomie. 1895. Bd. 16.

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294 MARLBOROUGH STREET.

DISCUSSION.

DR. KOPLIK.—In every case of continued fever that comes to my dispensary we are accustomed to make the Widal test immediately. My experience has been that of Dr. Wentworth, that cases with undoubted roseola, diarrhœa, etc., in which the physician could not make any other diagnosis from the history than that of typhoid fever, I very frequently failed to obtain the Widal reaction. Dr. Osler has published from the Johns Hopkins Hospital cases of typhoid, verified by autopsy in which the reaction to the Widal tests were absent throughout the course of the disease. So, I am sometimes compelled to make the diagnosis in spite of the absence of this test. In such a case as Dr. Wentworth reports I would not hesitate to make that diagnosis.

THE PRESIDENT.—I would like to ask what age Dr. Koplik's patients were in which he made the diagnosis in the absence of the Widal test.

DR. KOPLIK.—That is a very important point. I have found the Widal reaction absent in the older children and do not recall an experience of that kind with children below two years of age, but I cannot be positive on that point.

DR. FREEMAN.—It seems to me that it should be understood that a negative result with the Widal test means nothing, while a positive result means everything. What has been said to-day does not cast any reflection upon the Widal test. It simply means that in those cases it gave no information.

DR. ROTCH.—I think this is an exceedingly valuable contribution, not only from the standpoint of the bacteriologist and pathologist, but from the clinical side. It would have been valuable in the past to be able to say that meningitis could be caused by the typhoid bacillus. The French school has for many years recognized that, but it has always been doubted elsewhere, and it has made those of us who see cases in consultation, work at a disadvantage. I can recall some cases that appeared to be undoubtedly typhoid and when symptoms of meningitis arose the child was supposed to have a tubercular meningitis, while there was no proof of it beyond the fact that there had been a clinical picture of meningitis. Those cases I have thought in the past were cases of meningitis coming on in the course of typhoid fever, but I had no proof of it.

DR. WENTWORTH.—The reason that I said so much in the paper about the failure of the serum reaction is that recently I have seen a number of references, chiefly French, in which it was said that the serum reaction was invariably obtained in

cases of typhoid fever in children. I saw one article in which it was claimed that in 100 cases they had never had a failure. Such a statement as that is at variance with the results obtained by many competent observers. The serum reaction is undoubtedly one of our best methods of clinical diagnosis, but it fails at times, and I have no doubt that careful records would show in the work done by the same man, or men, that it fails in possibly 25 per cent of cases. This does not interfere with its positive value at all. There have been a number of cases reported in literature of cerebral symptoms in the course of typhoid, that were not due to meningitis.

ON VACCINOID.

BY F. FORCHHEIMER, M.D.,

Professor of the Practice of Medicine and of the Diseases of Children, Medical College of Ohio, University of Cincinnati.

The peculiar manifestation of vaccinia, which is the subject of this paper, has been known to exist for some time, being usually denominated false or spurious vaccinia. Any one who has had to deal with vaccination has seen these manifestations, but to the French authors especially, is due the credit of having studied the subject, and to have come to conclusions as to their relations to vaccinia. Trousseau (*Medizinische Klinik des Hôtel Dieu*, translated by Culmann, 1886, I., p. 73) was the first to call special attention to the subject, and Dumontpallier (*Bull. de l'Academie de Med.*, 1893, 3 S., p. 345) introduced the term vaccinoid. Hervieux ("Quelques mots pur la fausse vaccine," *Bull. de l'Academie de Med.*, 1893, 3 S., p. 345) was the first to give a complete clinical description of the subject, and he has been fully quoted by all authors who have written on the subject since. He divides the manifestation of vaccinoid into three classes:

I. After a period of incubation of about twenty-four hours there appears a pink papule without areola, which disappears in a few days.

II. With the same period of incubation a larger papule develops, which has a small vesicle developed upon its surface, and is surrounded by redness. The vesicle forms a small scab which falls off and does not leave a cicatrix.

III. Again the same period of incubation, a larger papule with better defined redness, a larger vesicle and crust, and finally the production of a cicatrix, which, however, does not persist.

It will be seen from this classification that by vaccinoid is meant an atypical course of the lesions produced by the act of vaccination, these having, in their external manifestations, the

same relation to vaccinia that varioloid has to variola, and possibly more, as will be shown further on. In the course of some vaccination experiments made in 1895 to determine other bearings of the subject, I succeeded in producing a number of vaccinoids which seemed to me of sufficient interest to warrant publication. At that time there was being advertised a vaccine virus which was claimed to be free from other germs beside those of vaccinia, so-called aseptic virus, a desideratum still unrealized, and I determined to find the effects upon the human being of filtered virus. Quite a large quantity of this so-called aseptic virus, in capillary tubes, was obtained; was first examined bacteriologically—with the usual result that it was found full of ordinary germs in glycerinated virus. It was then diluted with equal parts of a normal Na. Cl. solution and filtered through an improvised Kitisato filter. Under all aseptic precautions this virus was used, and seven children who had never been vaccinated before were vaccinated with it. The results were positive in 4 cases, negative in 3. Out of the 4 that took, 1 was true vaccinia, the others were vaccinoid. In the vaccinoid cases the results were the same in all, and are represented by excerpts from the clinical notes taken by my interne, Dr. Williamson, as follows, in one of the cases:

Day of Vaccination, I., June 13: Vaccinated in two places with filtered lymph.

" " III., June 16: Slight redness at edge of vaccination wound; slight elevation; no pain or other subjective symptoms.

" " IV., June 17: Redness somewhat increased; sharply defined.

" " V., June 18: Redness still greater; papule more elevated.

" " VI., June 19: Same as the day before.

" " VII., June 20: Same as the day before, except the redness continues; elevation more marked.

" " VIII., June 21: Papule still continues to be more elevated; no evidence of formation of vesicle; no infiltration around the papule.

Day of Vaccination, IX., June 22: Continues the same.
" " X.-XIV., June 23-24: No material change, except that the papule is growing smaller and the redness diminishing.
" " XV., June 25: Papule very much smaller; redness gone.
" " XX., July 3: There is left only a small area of reddened, glazed skin.

During all this time the temperature and pulse records were shown to be normal.

In the meantime a genuine Kitisato filter was used, with the same virus, by Dr. Kramer, who had already done work with filtered virus before, and control vaccinations were made upon 10 other unvaccinated children with negative results, showing, as has been shown before and abundantly since, that the vaccine germ does not pass through a filter; and that, as far as this point was concerned, our experiments proved nothing in that the lymph, undoubtedly, had been incompletely filtered in the first series of experiments.

If we now compare the results obtained in our positive cases with the statements made by Hervieux, we will see that they are not completely in accord with his statements. He as well as M. Alfred Vy and Mme. Aliot (l.c.) claim that vaccinoid never occurs in primary vaccinations; all the cases here reported are primary vaccinations and from my experience in private practice I am inclined to the opinion that they are just as frequent in primary vaccinations as in revaccinations. With the more extensive use of animal virus vaccinoid seems more frequent, although it was not uncommon in the days when we only used humanized virus. Hervieux's observations have led him to make the statement that the period of incubation is shorter for vaccinoid than for vaccinia, in the former being about twenty-four hours, in the latter about three days. In my cases the period of incubation was three days, and I have seen cases in which the period of incubation was prolonged to seven days. In the experience that I have had with vaccinoid it seems to me that at least two other forms should be added to those described by Hervieux. The first one is that described by R. Blache ("Vaccine efficace sans Manifestations Cutanées," *Revue des Maladies de Enfants*, i., 1883), in three of five primary vaccinations, with the same animal virus,

using a cannula, he found a swelling in the muscles, freely movable, lasting a long time, so that after six weeks it was still the size of a pea. I have also found this in several instances when I used lymph which was introduced under the epithelial layer by use of an exploring needle. The last form is that which is followed by what Sir Jonathan Hutchinson justly calls a vaccine keloid. (*Archives of Surgery*, i., 193-198). He ascribes this condition to difficulty of healing and prolonged ulceration, but I have seen it occur with vaccinoid when both were practically normal. These keloids last for years and, possibly, during the life time of the individuals, so that more than once the temptation has been strong to have them removed on account of the unsightliness of their appearance. Another form is that one described by Bosquet (see "Pfeiffer die Vaccination," *Tübingen*, 1884) in which no eruption took place but the ordinary constitutional symptoms followed upon the eighth day. A large number of cases of this kind was reported by French physicians (62 in all) in which this phenomenon was observed; all these were found immune to subsequent vaccination or inoculation, so that the proof of vaccinia sine exanthemate seems well established. I have never seen this form. The absence of constitutional symptoms, fever, enlarged glands, etc., has also been referred to in vaccinoid as marking its diminutive condition; secondary symptoms do occur in vaccinoid, provided there is a secondary infection, and during the last winter I found very many vaccinoids in revaccinations accompanied by high fever, enlarged glands and other constitutional symptoms, notably from one large batch of glycerinated lymph tubes supplied by a most trustworthy firm. It is claimed (Copeman, "Vaccination," London, 1899) that the bacteria of fresh virus do not produce suppuration, but in this instance, the date showed that the virus was too fresh and, after it had been kept for some time and then used, the untoward effects of its activity were wanting. In this connection it may be proper to state that it seems to be carrying things to extremes when Hervieux considers a simple redness around the vaccination marks as evidence of a successful vaccination. From a theoretical point of view it must be admitted that many other agencies besides the vaccine virus will produce a redness around a scratch, and from the practical point of view, I am sure, very few would not continue to vaccinate, in primary cases, under such circum-

stances until a result was obtained which, in my experience, has always been the case.

The most important questions in connection with the subject are: What relation does vaccinoid bear to vaccinia and in how far must it be considered as protective against variola?

In regard to the former we have the clinical experiment which answers the question. Dumontpallier, Hervieux, Vy, and Mme. Aliot (l.c.) have all taken the fluid from the vesicle in vaccinoid and by vaccination produced true vaccinia. Furthermore, as the result of the consensus of opinion of all those who have written on this subject, the conclusion can be positively arrived at that vaccinoid is only produced by introducing vaccine virus into the human system and by nothing else. The second question, to what extent vaccinoid protects, is more difficult to answer. I know of no statistics which show how well human beings protected by vaccinoid alone withstand infection by small-pox. There remains for this purpose only the proof that can be afforded by revaccination. In regard to the proof of immunity against variola as proven by revaccination, Seaton ("A Hand-book of Vaccination," 1868, p. 311) in discussing 20,309 cases of revaccination says: "The local results obtained by the revaccination of any individual give us absolutely no information whatever as to the constitutional condition in which the revaccinated person was with regard to liability to contract small-pox." While this may be true for variola, we certainly know of no better way for testing the efficacy of a primary vaccination than by the success of failure of subsequent vaccinations. Blache in his three vaccinoids, in revaccinating, using this time humanized virus, records three second vaccinoids, and upon a third vaccination, obtained vaccinoid in one of the cases. In my own revaccinations made within four weeks from the time of the first attempt, with animal virus, I obtained two typical vaccinations out of the three cases, the third case was negative. It will be seen that my results vary decidedly from those of Blache, who was able to obtain only vaccinoid upon second vaccinations, but the conclusion to be drawn is evidently the same, that vaccinoid does not protect against small-pox as efficiently as does ordinary vaccination. How well ordinary vaccination, *i.e.* vaccination as it is commonly practiced, protects, it is not the purpose of this paper to discuss. The practical conclusion, however, is obvious, that when a primary vaccination results in vaccinoid, revaccination should

be done and, in the presence of an epidemic, when revaccination is followed by vaccinoid, another attempt should be made.

The discussion of the etiology of vaccinoid can be based only on the basis of clinical experience, for as yet the contagium vivum of vaccinia has not been found. There are three things that must be taken into consideration: 1. The subject to be vaccinated; 2. The virus; 3. The method of vaccination. When Hervieux attributes his three forms of vaccinoid altogether to differing degrees of predisposition to vaccinia, he has certainly gone too far, as is shown by the experiments which I have made and by other testimony. That immunity to vaccinia may occur is accepted, but that it is extremely rare is shown by Seaton's (l.c.) statement, who in his enormous experience never found it, and in the remark made by him that in 9,000 cases at the Blackfriars' Station of the National Vaccine Establishment there was but one case which on a second trial was unsuccessful, the result of the third attempt in this case being unknown because the child was not brought back. That differing degrees of predisposition occur is as true for vaccinia as for other infectious diseases, but if vaccinia is infectious, and there is no doubt upon this subject, it is subject to the general law of infectious diseases that resistance to infection can be overcome by quality and quantity of infection where there is not complete immunity. So that the quality of the virus and its mode of introduction are to be looked upon as the principal factors in the production of vaccinoid. In my own cases the quality of the virus was undoubtedly the cause of the vaccinoid; for the same virus, undiluted, and, partly unfiltered, produced true vaccinia where before it had produced only vaccinoid. In Blache's cases the evidence is not conclusive because the second time he used humanized virus. Much might be said on the subject of the quality of virus which we use nowadays; we no longer propagate our own virus, fortunately for us, but we trust to commercial virus which has been stored, possibly unfortunately for our patients. Certainly, in my own experience, second and third attempts at successful primary vaccinations, as well as vaccinoids, are more common than they were in the days when I was able to vaccinate from arm to arm, or to collect the virus in capillaries and keep it. The time when the virus is taken, the method of storing it and the time when it is used are, to my mind, the principal factors in the causation of vaccinoid. It is

not my purpose to discuss methods of vaccination, but it is more than likely that the more thoroughly vaccination is done, the fewer the cases of vaccinoid, provided the virus is perfect. Vaccinoid is an abortive vaccinia, and abortive vaccinia is not perfect vaccination, and imperfect vaccination is the result of error in method.

The conclusions that I would present for your consideration are:

I. Vaccinoid is always modified vaccinia.

II. Vaccinoid protects against variola.

III. This protection is less than that of vaccination.

IV. Vaccinoid in the majority of instances is due to faulty method, rarely to increased resistance or immunity.

V. In primary vaccinations vaccinoid should always be followed by repeated attempts until either true vaccinia is produced, or until positive evidences of immunity exist.

VI. In the presence of an epidemic of variola, vaccinoid should be followed by revaccination both in primary vaccinations as well as in revaccinations.

FOURTH AND SYCAMORE STREETS.

DISCUSSION.

DR. PUTNAM.—It seems to me the word vaccinoid has not been used in this paper in a sense analogous to the word varioloid. I do not think it is recognized that varioloid is a case of variola occurring in a person who has had vaccinia and I do not think that vaccinoid should be used to refer to an individual who had had previous vaccination. I do not think any person has vaccinated individuals immediately after a successful vaccination in order to see how much immediate protection there was, but it would be an interesting thing to do. I should hope the term vaccinoid would be confined to cases of secondary vaccination and that others would be called mild cases of vaccinia.

DR. FREEMAN.—I think that these irregularities following vaccination will become much less frequent now that we have better lymph. The glycerinated lymph in capillary tubes is comparatively free from contaminating bacteria. It has been found that in about three months after a mixture of lymph with equal parts of glycerine the contaminating bacteria become much reduced in numbers, whereas the lymph becomes more efficient

for vaccination. We had an experience at the Foundling Hospital with seventy vaccinations done with the glycerinated lymph of the New York Board of Health and carefully protected from contamination, the children being all vaccinated on the leg and all did well, there not being one bad leg among the seventy.

DR. DORNING.—The term vaccinoid, it seems to me, is only adding another word to our already overburdened nomenclature. We either have vaccinia or we have not and the condition described as vaccinoid appears to me to be either a modified vaccinia, or some infection due to some extraneous irritant in the lymph. Varioloid is regarded as a distinct entity, but the question comes up if even it should be considered as such, or if it should not be looked upon as a modified variola.

DR. FORCHHEIMER.—I was rather prepared for this objection to the term "vaccinoid," and indeed in this Society I am always prepared for possible discussions on nomenclature. I assure you I had nothing to do with the introduction of the term and think it is a barbarous combination of a Latin noun and a Greek ending, but the term *has* been introduced into literature, and there it is. In regard to the relation of this condition to vaccinia it seems to me it is the same as that of varioloid to true variola. I am not prepared to stand responsible for the term vaccinoid, but it has been introduced into English literature, where there are a great many other terms I would reject if I could.

INCONTINENCE OF URINE IN CHILDREN.

BY FRANCIS HUBER, M.D.,
New York.

Few morbid conditions in children are more annoying, or present greater difficulties in treatment, than those grouped under the head of incontinence of urine.

In a measure, this is due to the fact that the causes are numerous and often complex; secondly relapses are frequent, unless the patients are kept under treatment for some time after apparent cure. The importance of prolonged continuous treatment, even though the patients are under direct control, is well illustrated by the experience of Kerley referred to by Holt. We must not forget that the affection, at times, shows periods of improvement, particularly in summer, to relapse, or become aggravated when the cold weather appears, the general health deteriorates and sometimes without apparent known cause. In some cases incontinence occurs during the day only, in the greater number at night, in others it is present both day and night.

The diagnosis of the condition is easy, the recognition of the cause, a point essential to correct treatment, is a more difficult problem. In studying the question, the work may be facilitated, bearing in mind the associated neurotic element, by a consideration of the condition of the sphincter, the state of the bladder and finally the innervation.

Up to the age of eighteen months to two years, depending upon the early training and care in the management of the child, urine and fæces escape involuntarily.

The anal sphincter is the first to gain sufficient power, and usually by the second year the vesical sphincter attains control over the bladder. In some cases the power is never acquired, in others, once gained it may be lost, for the time being, during illness or lowered vitality. Fortunately, spontaneous cures occur in many rebellious cases about the time of puberty, attending the rapid development of the whole genito-urinary tract.

In practice we observe cases in the weak, as well as in those whose muscles are well developed. Debility and anæmia, it will be found, are frequently associated as contributing causes.

A study of the literature, and of a large number of cases, which have come under personal observation, show that the condition is met with in many varied states, but underlying all there is one common factor—a neurotic condition or family history. Too much importance cannot be attached to the neurotic element, often more pronounced because of the associated anæmia. Many of the cases, therefore, must be viewed as a neurosis, pure and simple; in others, one or more additional factors, keep up the annoyance and must be removed before improvement takes place.

Frequently, notwithstanding the most careful search, the predisposing cause cannot be detected, and we are then compelled to resort to empirical remedies.

In all cases, however, a careful search should be instituted for a possible cause; if one is found, we are in a position to act intelligently, and with greater prospects of success.

Those caused by organic disease of the brain or spinal cord, and malformations of the urethra or bladder may be referred to incidentally, but do not properly belong to the class under consideration.

Local conditions as small meatus, preputial adhesions, adhesions about the clitoris, irritation and inflammation of the prepuce and glans, inflammation of the urethra, bladder, or rectum, stone in the bladder, constipation, hardened fæces in the rectum, rectal polypi, anal fissure, and pin worms are easily recognized.

The condition of the sphincter must be investigated, the bladder and its contents carefully studied, and finally the state of innervation ascertained. Frequently the sphincter is at fault. Incontinence then may be the result of a weak sphincter, or a part of the general weakness and muscular incompetency, due to a defect in its muscular tone. In the latter instance the patient may be anæmic and poorly developed, or the muscles may be normal, the sphincter alone being involved. No rule can be formulated, the feeble, anæmic, poorly-developed may or may not have strong sphincters—apparently robust children, on the contrary, may be affected.

Children who pass urine involuntarily while intent in their

play or study, are heedless or suffer from debility of the sphincter and want of mental control.

When the urine is passed with force some other factor than deficient power in the sphincter must be looked for. Masturbation frequently gives rise to incontinence; the explanation is found in the presence of a chronic inflammation at the prostatic portion of the urethra and neck of the bladder, with increased irritability and sensitiveness of the parts to the presence of urine.

Nocturnal and diurnal incontinence ordinarily suggests a lack of tone in the sphincter and defective innervation. When due to organic disease in the brain or spinal cord incontinence of fæces is also found, and such cases are usually beyond remedial agents. If due to compression in Pott's disease, recovery takes place when the cause is removed, or disappears as the result of treatment directed to the morbid state in the vertebræ.

In this connection we may profitably discuss the large number of cases occurring in children suffering from lymphoid hypertrophies in the naso-pharynx. A careful study of this part of the subject is important. Many of the patients make the rounds of the dispensaries, and consult various practitioners without permanent relief, until finally the remote cause of the trouble is recognized and removed. To digress for a moment. The question now comes up—what relationship exists between the incontinence and the adenoids? Certainly not reflex. A more logical and intelligent explanation is afforded by a consideration of the *pathological conditions* induced by (*a*) the obstruction of the lymph and blood circulation in the brain; (*b*) the retention of the morbid products of cerebral tissue metamorphosis, and finally (*c*) the changes in the blood from deficient aeration—all secondary to, and the direct consequence of the growth of the hypertrophied structures of the lymphoid tissues at the vault of the pharynx.

The valuable anatomical investigation of Axel Key and Retzius have demonstrated beyond question the connection between the sub-dural and sub-arachnoid lymph spaces, and the lymph vessels of the nasal mucous membrane.

The hypertrophy of the lymphoid structures of the naso-pharynx and the presence of large adenoids interferes with the lymph circulation. In consequence, the products of cerebral tissue metabolism accumulate in the brain and induce brain fatigue or "retention exhaustion."

Secondly, the general circulation is primarily affected and the cerebral necessarily involved because of the excess of CO_2 and the deficiency of O, the result of defective aeration. Thirdly, the swelling and infiltration obstruct the circulation in both the blood and lymph vessels, particularly the latter. As a result of the impediment at the base, the neighboring portions of the brain are involved, producing effusion and exudation. The meninges and encephalon participate in the morbid process, and induce the mental state so characteristic of the trouble. In some cases, fortunately rare, the changes may be permanent. Guyer of Amsterdam has applied the term "aprosexia" to the mental condition. Such patients are pale, dull, stupid looking and backward. It is impossible for them to fix their attention, they are usually listless, forget readily and cannot study without discomfort the suffering increased by headaches, more or less severe and annoying.

It is not at all surprising that under such circumstances a lack of will power is found with loss of control over the vesical sphincter, the latter further weakened by the existing anæmia, causing diurnal and nocturnal incontinence.

In a number the predisposition appears to be inherited, for it is a common experience to find the children of neurotic parents afflicted in this manner. In one instance all the children of a mother with hystero-epilepsy were affected. In dispensary service such cases are by no means infrequent. In chorea a want of co-ordination between the sphincter and the detrusors is assumed. Occurring as a complication of epilepsy, the underlying cerebral disturbance must be regarded as the factor in the etiology.

Digestive disturbances, late suppers, heavy meals, and the ingestion of large amounts of fluids act as exciting causes. Drinking large amounts of water particularly at night, immoderate indulgence in weak tea, coffee and in some instances alcoholic beverages are frequent incidental factors in the etiology. Moderation in this respect is often followed by a disappearance of the disorder.

A short time ago a rachitic child of two and one-half years of age was presented because of the anæmic, flabby state and incontinence. In taking the history it was elicited that the child's diet was chiefly milk, as much as three quarts being taken daily. The amount of milk was reduced and solid food

ordered; also advised strych. sulph. and syr. hypophos. c. fer. The beneficial effects were soon evident, for the urinary difficulty quickly disappeared.

Independent of the quantity, the character of the urine may excite the bladder, and lead to premature contractions. Large meals, particularly an excess of nitrogenous materials with inadequate assimilation, give rise to increased amounts of urates and phosphates. Excess of urates, phosphates, oxalates or uric acid, highly concentrated urine, and hyperacidity, act in a similar way.

The small bladder found in many occurs as a congenital anomaly or an acquired defect. In the latter case, though not the primary cause, it tends to keep up the habit. The organ becomes contracted, and when the incontinence has persisted for a while, its capacity becomes less and less, and eventually may not exceed two or three ounces.

The frequency of urination establishes a practice which gradually degenerates into a habit; as a natural sequence, the viscus becomes accustomed to contract when only partly filled. The cause of the incontinence having been removed, the bladder gradually regains the power to hold larger and larger amounts, or the organ may be distended by a boric acid solution, etc., larger quantities being employed each time, twice or three times a week.

PROGNOSIS.—In cases of organic disease of the brain or spinal cord and in malformations, unless amenable to surgical means, the prognosis as to cure is poor. In the larger proportion of cases generally occurring in practice, if the cause can be discovered, the prospects of speedy cure are good. Those due to neuroses usually yield to continued treatment. Many otherwise rebellious cases fortunately get well about the period of puberty. In a small number the functional trouble persists beyond this time, and in a number of girls does not disappear until after marriage. The disorder is most frequent between the third and tenth year. The majority of those affected from the age of ten to fourteen years and over belong to the male sex.

TREATMENT.—It is very evident then that the treatment will vary with the nature of the underlying cause or causes. In the majority of cases general rules must guide us in the management, for no one remedy or plan can be depended upon to secure a favorable result under such conditions.

To quote a recent writer, "A very superficial survey of the pathology of enuresis will demonstrate the futility of any one drug in all cases. We can hardly conceive of a single remedy alike applicable to oversensitiveness of the bladder, to weakness of the sphincter, to hyperacidity of the urine and to a riotous nerve system."

The general health demands our first consideration and the nutrition should be improved. Roborant treatment, massage, sponging (local and general) and out-door exercise, gymnastics, etc., are advocated. The anæmia must be treated with iron and other tonics, the bowels are to be kept open, the digestive functions regulated and the urine examined for abnormal products (or too large amounts of any one or more of its constituents). A light, easily-digested evening meal, with but little water afterwards, should be insisted upon, no tea, coffee, or alcoholic beverages allowed. The little patient ought to pass urine before retiring and the bowels be encouraged to move at the same time. As such children wet the bed once or twice during the night at a fairly regular hour, they should be aroused before the accident happens, and made to pass water. Sleeping upon the back, or too much covering should be avoided. Raising the foot of the bed in some cases will prevent the urine reaching the sensitive trigone and neck of bladder and prevent the nocturnal incontinence.

Strychnia in full doses is indicated as a general tonic; when the sphincter is weak, in rebellious cases the remedy may be employed subcutaneously in the perineum. Ergot has been recommended in irritability of the spinal centres due to congestion. Electricity has been advised and good results are claimed.

Cases of irritable bladder due to masturbation are intractable, the evil practice must be conquered, and the congested and irritable posterior urethra, treated by local application of silver nitrate, etc. Reflex irritation of whatever nature and inflammatory conditions must not be lost sight of, whether situated in the urethra, vagina or rectum, prepuce or glans, bladder or kidneys.

In a great many instances, as no cause can be discovered, the condition must be regarded as a neurosis. Under such circumstances and in the majority of cases where predisposing factors have been removed, belladonna or its alkaloid must be

given. Belladonna and strychnia, single or in combination, are tolerated in much larger doses by children in proportion to the age.

A single dose of belladonna or atropin at night gives relief; it should be given to produce the physiological effect, a transient flushing of the face. In case the want of control of the sphincter is due to the "aprosexia" incidental to adenoids, the patency of the naso-pharynx must be restored and then only can we expect a cure.

As a routine plan, the following will yield encouraging results in quite a large proportion of cases. Fluids are to be restricted, particularly in the evening; a light early supper, several hours before retiring, is given; the bowels are to be evacuated and water passed before going to bed; one full dose of tr. belladonna at bed time. A tonic of strychnia and iron three times daily for some time on general principles. In addition the patient is to be aroused once or twice during the night to pass urine.

Such patients are not to be punished, scolded or held up to ridicule; on the contrary, harsh measures tend to keep up the annoyance. Patience, kindness, with strict adherence to the measures referred to yield excellent results, if conscientiously persisted in for a time.

In the accompanying table an attempt has been made to classify the causes of incontinence. This, as will be readily conceded, is a difficult task.

In many instances several factors are more or less intimately concerned in the etiology. Moreover, in a large number of the cases there is an essential neurotic state or neuroses:

Varieties: Nocturna (common)—Diurna—Continua.

Three factors: Condition of sphincter, (*b*) bladder, (*c*) innervation.

(1) MALFORMATIONS	Small meatus, small bladder (natural or acquired). Hypospadia (perineal). Exstrophy of bladder. Epispadia.
(2) ORGANIC DISEASE OF NERVOUS SYSTEM	Idiocy, cerebral palsy, meningitis, ch. hydrocephalus, myelitis, injuries of cord, and Pott's disease, with compression or inflammation of cord.
(3) FUNCTIONAL (?) DISORDERS	Epilepsy, chorea, diabetes (mellitus and inspidus). Hysteria, neurasthenia, anæmia resulting in poor innervation and muscular development.
(4) WEAK SPHINCTER	*a*. Infantile condition persisting. *b*. General muscular incompetency, or *c*. Result of exhausting diseases, lowered vitality, general anæmia. Neurotic state.

(5) IRRITABILITY OF BLADDER	*a*. Inflammatory processes		Urethritis, balano-postitis, vulvo-vaginitis, cystitis, nephritis, pyelitis, rectal catarrh, ch. inflam. of prostatic portion and neck of bladder due to masturbation.
	b. Local		Stone, polypoid excrescences at neck of bladder, hyper-acid urine, excess of urates, oxalate uric acid, concentrated urine, excess of phosphates due to digestive disturbances and imperfect assimilation. Bacteriuria.
	c. External (Reflex)		Periurethral and perivesical inflam. Phimosis, preputial adhesions and balano-postitis, urethral inflam., vaginal catarrh, rectal catarrh, irritation due to pin-worms, constipation, hardened feces in rectum, fissure, and polypoid of rectum.
	d. Distended Bladder		Excessive secretion of the urine due to large amounts of fluids ingested; diuresis due to drugs, alcohol, tea, coffee, etc.
(6) DEFICIENT INNERVATION	Emotional		Mental excitement—eager play. Fear of darkness or cold room. Wilfulness. Bad habits.
	Auto-suggestion		The child having wet the bed, and having been scolded or punished, the habit continues through fear. Dreams.
	Undue excitability of sphincter		Neurotic state. Masturbation. Sleeping on back.
	Enfeeblement of will		Anæmia, hysteria, neurasthenia. Lymphatism (adenoids).

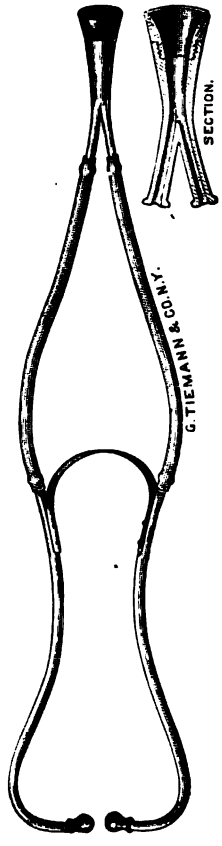
209 EAST SEVENTEENTH STREET.

A NEW BINAURAL STETHOSCOPE FOR THE EXAMINATION OF INFANTS AND CHILDREN.

BY HENRY KOPLIK, M.D.,

New York.

I wish to present to this Society a stethoscope intended only for the examination of infants and children. The instruments to be found at our disposal are very imperfectly constructed. They do not seem to have been put together with any other definite object than the diminution of bulk. In attaining this I think the acoustic properties of the instruments have suffered. The present instrument meets very successfully the requirement that the smaller instrument should not only conduct the sound but do this, if possible, even more satisfactorily than the larger instrument intended for the adult. It must be admitted that the large chest piece of the binaural stethoscope intended for the examination of the adult is not satisfactory when used upon the chest of the infant and young child. The cause of this is that the opening of the chest piece is much too large for the chest. A confusion of sound results. Thus a fine crepitant râle or a faint murmur is easily masked by the sounds in the neighboring parts of the chest. Limitation of the auscultation to the smallest possible area adds to distinctness and definition.



The best binaural adult instrument now in use is undoubtedly that made by Tiemann & Co., in New York, after the suggestions of Dr. Yankauer. In this instrument the opening in the chest piece tapers gradually to the division into the two conducting tubes. At this point the cross section of the chest piece is equal to the combined cross sections of the two arms. A perfect acoustic instrument is thus obtained. My stethoscope is the exact counterpart of this

instrument, except that it is geometrically reduced in size until it has the measurements shown here. The opening in the extremity of the chest piece is 19 millimetres or just 2 centimetres scant in diameter. From this opening there is a funnel-shaped cavity tapering gradually to the openings of the two arms of the chest piece, giving a large sounding funnel. Though the chest piece is smaller the sounding concavity is greater than that of any of the smaller stethoscopes in the market.

I have had this instrument in use for more than a year and can say that it is far in advance as to performance of the other instruments formerly at my disposal. There is more distinctness and less confusion. The result is perfect conduction of sound. It will be seen that the chest piece, though small, has a much larger sounding concavity than many of the much larger instruments. The instrument moreover is very compact and durable. The chest piece is constructed of one heavy piece of metal faced at the extremity with hard rubber. The arms which enter the ear have a cross section exactly equal to the dividing arms of the chest piece. The instrument is thus a uniform acoustic whole.

66 EAST FIFTY-EIGHTH STREET.

SCURVY IN AN INFANT OF SIX WEEKS.

BY FLOYD M. CRANDALL, M.D.,

Adjunct Professor of Pediatrics, New York Polyclinic; Visiting Physician, Hospital for Scarlet Fever and Diphtheria; Consulting Physician, Children's and Infants' Hospitals.

After the extensive consideration given by this Society to the subject of scurvy in infants, the report of a single case could only be justified by its possessing elements of unusual interest. That, I believe, is true of the case I report, the elements of particular interest being the age of the infant and its diet. When the first symptoms were noticed the child was five weeks and five days old, and it was exclusively breast fed.

The youngest case reported last year by the Collective Investigation Committee of this Society was three weeks old. It was the patient of Dr. A. Matheson of Neillsville, Wis. "This was a child of four weeks who had already been ill five days when first seen. The child was fed at the breast. Its hygienic surroundings were poor. The disease exhibited perfectly typical symptoms, and ended fatally."

The next oldest case included in the committee's report was one and one-half months old. There were three children of two months. Among 359 cases, only 7 were under four months and but 34 were six months or under. The period of greatest frequency was between eight and eleven months.

Of the 36 cases reported in 1894 by Northrup and Crandall, the youngest was four months old. This case was reported by Dr. Stowell, of New York. The child was a dispensary case, and was fed upon condensed milk. The symptoms rendered the diagnosis certain, and improvement followed a change of diet.

Among 64 cases tabulated by Bovaird (*Philadelphia Med. Journal*, 1898, Vol. ii., No. 8), the youngest was six months old. The average of all the cases was twelve months.

As to diet, Northrup and Crandall in their 34 cases found but one child exclusively breast fed. In this case, however, the child was nursed by a woman who was also nursing her own child. Her own thrived; the foster child became scorbutic. The inference to be drawn is clear.

Bovaird in his 64 cases found 3 that were breast fed. In one the reporter states that under supposition that the child was suffering from specific taint, both mother and child had been kept for several months strongly under the influence of mercurials. Analysis showed the mother's milk to be deficient in every respect. In the second case details are not given. In the third case, which was reported in detail, the reason for the occurrence of scurvy is very obscure.

The Collective Investigation Committee, among 365 cases, found breast milk alone as the diet in ten.

Southgate (*Archives of Pediatrics*, Vol. x., No. 6) reports the case of a breast fed child fifteen months old who developed typical signs of scurvy. The diagnosis was confirmed by Dr. Rachford. The milk, so far as chemical analysis showed, was normal. There was, however, a very strong family history of tuberculosis. The child suffered from marked gastro-intestinal disorder and was extremely anæmic.

I believe it to be a fact that in every case thus far reported, in which a breast fed child has developed scurvy, there have been some complicating conditions of abnormal character. In several instances, the mother has been ill or the milk has been found to be of inferior quality. For example, in Southgate's case, in which the milk was normal, according to chemical analysis, there was a strong family history of tuberculosis; the child had suffered from gastro-intestinal disease and was very anæmic.

In the following case there were several abnormal conditions which make the occurrence of scurvy in a breast fed infant of six weeks seem less strange:

J. E. was born October 12, 1898. The father had not been in his usual health; he had long suffered from chronic rheumatism, and for more than two years had had chronic cystitis, and now has nephritis. He gave no syphilitic history whatever and showed no signs of that disease. The same may be said of the mother; while the patient never gave any evidence of specific taint.

The mother did not recover from the effects of the confinement for many weeks. In fact, she has never been as well since that time as before. She has had acute articular rheumatism, and now has valvular cardiac disease. She was excessively anæmic. There was nothing in the family history, therefore, to account for the disease in the infant.

I first saw the child on November 28th when it was six weeks and five days old. It had never been a strong child, but, except for some indigestion, it had suffered from no illness until one week before my visit, namely, on November 21st, it then being five weeks and five days old.

On that day the child began to fret and worry and showed unmistakable evidences of pain. It cried when it was moved and it was soon noticed that the left arm was limp and did not move like the right. It was, moreover, painful to touch. The attending physician was called, as it was supposed that the arm had been injured. He found no evidence of an injury, however. On the third day swelling was first noticed. The swelling slowly increased, the arm became more painful, and the child cried at every touch. After five days, the right arm also began to be painful and became limp like the left. On the following day it began to swell. There were no other definite symptoms. There was slight indigestion but the bowels were fairly regular. There was no cough nor history of fever. The head was inclined to sweat when the child slept, but not excessively.

Upon examination, I found the child extremely anæmic with peculiar sallow complexion. It was not, however, marasmic nor wasted. There was no beading of the ribs, enlargement of the epiphyses, nor craniotabes. There was no pulmonary nor cardiac disease. The temperature was $99\frac{1}{5}°$.

The child cried upon being moved in a way to show pain, not simple irritability. The left arm was markedly swollen between the wrist and elbow, but there was no swelling at the wrist. There was, also, swelling of the upper arm above the elbow and some swelling on the flexor aspect of the elbow. At the latter point the surface was dark in color, but in other places the skin was simply tense and shiny and not discolored. The swellings were exquisitely painful to the touch. On the right forearm there was a pad of swelling just above the wrist over the flexor surface; this was also shiny and tense. When

touched, the child made some attempt at moving the right arm, but no such attempt whatever was made to move the left. The legs were not swollen.

There were numerous mottled spots over the child's body, several being quite dark in color, but there were no actual petachiæ. There was no swelling nor discoloration of the gums and they did not at any time bleed.

The physician who had occasionally seen the child, lived in Brooklyn and failed to meet me at the time appointed for the consultation. I did not feel at liberty, therefore, to institute treatment and the child continued for twenty-four hours longer to take the digestive mixture which had already been prescribed and also an opiate to relieve the pain. On the following day, at the request of the physician, I took charge of the case. It is but justice to him to say that he had seen the child only on the second day of the illness, as he lived at a great distance.

I then found the left arm even more swollen than it had been on the day before, but the right remained unchanged. During the night both legs had begun to swell, the right being most seriously involved. The swelling appeared chiefly along the shaft of the femur, but it extended over the knee itself and a little below it. The skin over the swellings was not discolored. The child screamed at every movement or touch. The legs were apparently paralyzed and were drawn up into a position which has been described as typical of scurvy. The infant was a most pitiful sight.

The diet received immediate attention. The child had never taken anything but breast milk, the supply of which was very great. At my first question the mother offered the opinion that it was poor, for it was thin and watery. She could easily express by the hand a half teacupful. In fact, the baby was being chiefly fed upon the milk thus expressed, because of the pain produced by holding it to the breast to nurse. After the removal of three ounces or more the breast still seemed well filled and would have supplied another child. It was the most watery looking breast milk I have ever seen, particularly that at first drawn. The amount was so large that it at once occurred to me that the child never emptied a breast in nursing, but was simply getting "fore milk" which, it is well known, contains a much smaller amount of fat than does the later milk.

The child nursed regularly every two hours and seemed to be satisfied. A small amount of milk was at times regurgitated soon after nursing, and there was at times considerable flatulence. While the digestion was not at any time perfect, it was but seldom seriously deranged.

The mother took a general diet, eating meat but once a day. She had not been out of the house since the birth of the child. She took three milk punches a day, but I believe no other alcoholic stimulation. As before stated, she was anæmic to an extreme degree, and complained of constant backache and pelvic pains.

I made an examination of two samples of the milk by Dr. Holt's apparatus and by the centrifuge. The first was obtained by expressing the milk from the breast four hours after nursing. About three ounces were taken. This, I believe, was the food the child was actually getting. The second sample was taken immediately after the baby had finished nursing.

The first sample was extremely thin and watery in appearance, and neutral in reaction. The specific gravity was 1027. By Dr. Holt's method the fat percentage was 1.6. By the centrifuge the percentage was 1.8. The second sample was perceptibly whiter and less watery than the first. The reaction was neutral; the specific gravity, 1026. By Dr. Holt's method it showed 2.4 of fat. By the centrifuge 2½ per cent. of fat was shown.

The very low percentage of fat and the low specific gravity showed an extremely low percentage of proteids—in other words, excessively poor milk.

I at once changed the feeding without waiting the result of the analysis. A brilliant result might perhaps have been obtained by stopping the breast milk at once, and placing the child upon cow's milk, with the occasional administration of orange juice. The child's condition, however, was so precarious that I feared too radical a change. An attack of acute indigestion at that juncture would certainly have proved fatal.

I directed, therefore, that a teaspoonful of fresh, unpasteurized cream should be mixed with three teaspoonsful of water and should be given immediately before each nursing. The cream was obtained by taking six ounces from the top of a quart of milk. I directed the mother to eat more meat, reduce the

stimulants she was taking, and begin to take exercise in the open air. She was directed to express half a teacupful or more of milk from the breast before each nursing and to nurse the child regularly every two hours during the day and four at night. The mixture of pepsin which the child had been taking with evident benefit was continued. No other medication was given. After the scorbutic symptoms had subsided, iron was prescribed.

After two days the amount of top milk was increased and the mother was directed to discourage breast feeding. Cow's milk was gradually substituted until at the end of eight days the child took exclusively a mixture of the following strength: Fat, 3 per cent.; sugar, 6 per cent.; proteid, 1 per cent.

On the day following the change of treatment, the child had made no improvement but was not worse. On the second day there was certainly less pain but no other change. On the fourth day, the change for the better was undoubted. The pain was markedly diminished, there was no crying when the child was quiet, and but little when she was moved. She would lie perfectly still for an hour at a time. The limbs were less sensitive to touch. The discolored spots upon the body were less distinct. The swellings were but little diminished but there were no new ones and no increase in their size at any place.

At the end of a week, the pain was practically gone; the child moved all its limbs in quite a natural way. It was contented and quiet, and cried but little. All the swellings were diminished in size, and those of the legs had nearly disappeared. The left arm was but little swollen, but the peculiar swelling over the right forearm still remained. It was two weeks before the child could be considered as well, and even then there was a little diffuse and rather indefinite swelling about the arms.

After two weeks, as the breast milk continued to be very abundant and showed fully 3 per cent. of fat and a gravity of 1029, the mother was permitted to nurse the baby three times a day, the nursings being those of the night and early morning. The baby digested the breast milk better than the cow's milk. Upon increasing the number of nursings, however, with corresponding decrease of cow's milk, the pain and restlessness returned after a few days and undoubted swelling appeared in each arm.

The feeding continued to be a somewhat difficult problem, for the digestive power was always weak, as well as erratic and variable, so that frequent changes in the composition of the food were necessary. However, with many discouragements, the child was kept chiefly on cow's milk.

Although there were no further scorbutic symptoms, the subsequent history of the case was interesting, for the poor child was not yet through trouble. During January and early February it suffered from severe furunculosis which for a time threatened its life. During a period of nearly three weeks there were forty furuncules and abscesses. They were located chiefly about the head, neck, and chest. The child, however, survived the ordeal and gradually returned to a better condition than it had yet shown.

It was progressing quite satisfactorily until March 22d, when it was seized with pneumonia. The disease developed with extreme rapidity; the temperature soon reached 105° F., and continued at or above this point without remission. The child was literally overwhelmed by the disease and died on the fourth day at the age of twenty-three weeks. The little one was seen by Dr. C. G. Kerley who concurred without hesitation in the diagnosis. The pneumonia was the direct cause of death and had, I believe, no relation to anything that had gone before.

113 WEST NINETY-FIFTH STREET.

DISCUSSION.

DR. DORNING.—A child was brought to me when seven months old because he did not thrive. His family history was good. Since birth he had been fed on various artificial foods, alone and in combination with milk. The action of his bowels has been variable and his digestion has been capricious. Examination showed a poorly developed baby, extremely emaciated, quite anæmic and somewhat rachitic.

The bowels were cleaned out with a few small doses of calomel. He was ordered a food composed of top milk, three parts, water, five parts, and peptogenic milk powder, a heaping teaspoonful to eight ounces of the mixture. The milk was heated to just the boiling point. It was retained and well

digested from the beginning and he immediately began to improve. His progress was rapid and steady, gaining from eight to twelve ounces a week.

When ten months old the mother noticed that he cried whenever his napkins were changed; this continued for a week, getting worse each day. She then discovered that his legs hung limp and that he screamed when they were moved, but that he seemed to be perfectly comfortable when lying on his back, undisturbed. He continued to take his food as usual and his bowels were regular.

The lower third of each thigh was found to be very painful to the touch. Raising either leg caused the patient to scream. There was no swelling or discoloration of the parts, nor of any other part of the body. The mouth was healthy. He seemed to be well nourished, his flesh was firm and he had been gaining in weight right along. The anæmia had almost entirely disappeared. His general hygiene was good.

The steadily improving condition of the patient caused me to hesitate in diagnosticating scurvy. To determine the question of its being an attack of rheumatism, sodium salicylate, three grains every three hours, was given and absolute quiet enjoined. At the end of thirty-six hours there was some improvement and by the fourth day he moved his legs voluntarily and gave no evidence of pain when they were handled. He continued thus for nearly two days, when he again began to scream when his legs were moved. As before, they remained motionless and he appeared to be comfortable when lying quiet. A swelling now (on the seventh day) appeared on the lower third of the right femur just above the condyle. It was mostly on the inner aspect of the limb. On the following day the left leg showed a slight swelling in the same situation. The skin over these swellings did not feel hot and showed no discoloration. The swellings felt semi-elastic to the touch, but did not give a sense of fluctuation, did not pit on pressure and were painful on manipulation. There was no pain in any other part of the body, neither was their swelling nor discoloration of the skin. The gums appeared to be healthy. The salicylate of sodium was stopped and the juice of two oranges a day, to be given in divided doses, was ordered. No change was made in the diet. Within twenty-four hours improvement began and on the third day all pain and swelling had subsided. The same diet, with the juice of one large orange daily, was continued for some weeks longer. He continued to thrive, and at ten and a half months cut his first teeth.

The points of interest in connection with the case, are: First, the development of the scurvy notwithstanding the steady physical improvement of the patient. Second, the temporary amelioration of the symptoms coincident with the administration

of the salicylate of soda. Third, the steady and permanent disappearance of all manifestations attending the exhibition of the orange juice, without any change of the diet.

DR. ROTCH.—It does not seem worth while to waste time in scorbutus with salicylate of sodium, because a large number of cases have been treated in that way without any good result.

DR. GRIFFITH.—There is a question in regard to the toothless age that is worth mentioning. The statement is made by Barlow, and is made in italics, that before the stage of the eruption of the teeth there is no characteristic eruption on the gums. I have seen no case myself at an age before the appearance of the teeth, but in the investigation by this Society last year there were 45 cases reported as occurring before that age, and in 24 of those the gums had been the seat of eruption. Of course this Society is not responsible for the statements of those reporting cases to us, but it seems to me hardly likely that all those physicians were wrong, and I think I am right in stating that some members of the Society have seen affections of the gums before the teeth appeared.

DR. KOPLIK.—The last case of scorbutus I saw was marked by a hemorrhage of the gums before the eruption of the teeth.

DR. WENTWORTH.—I would like to ask Dr. Crandall whether he thought the swelling was due to subperiosteal hemorrhage?

DR. ADAMS.—I want to put myself on record as having seen two cases during the past spring where the teeth had not erupted. In one the hemorrhages in the gums were very extensive, and in the other both the lower gum and the tip of the tongue were affected.

DR. ROTCH.—I have seen very extreme cases of scorbutus where these swellings occurred and where there was undoubtedly periosteal hemorrhage without any hemorrhages elsewhere.

THE PRESIDENT.—I have seen one very severe case with prolonged swelling over two of the lower teeth that had not yet cut through.

DR. CRANDALL.—As to the swellings, we know that many of them result from subperiosteal hemorrhages, but I do not know that that was the cause in this case. I once made an autopsy upon a boy of thirteen in the idiot asylum who had died with scurvy. In that case there was no subperiosteal hem-

orrhage. I should be inclined to think that in this case there was not in the legs at least, because the swelling came on very rapidly and its subsidence was very prompt, much more so than in the arms. This case has unsettled my ideas as to the etiology of scurvy. It seems to me it was not so much a lack of something in the milk as the presence of something that caused the trouble. As soon as the baby was put back on that milk again it began to get restless, and I think if I had allowed it to continue we should soon have had a return of the same condition.

THE IMPORTANCE OF PROLONGED REST IN BED AFTER ACUTE CARDIAC INFLAMMATIONS IN CHILDREN.

BY L. EMMETT HOLT, M.D.,

Professor of Pediatrics, New York Polyclinic; Attending Physician to the Babies' and to the New York Foundling Hospitals, New York.

The general impression prevails that the prognosis in acute cardiac inflammations of a severe type is much worse in childhood than in later life. Certainly the consequences of such inflammations which are continually brought to the physician's notice, whether in hospital, dispensary or private practice, would seem to justify the opinion.

There are three reasons why cardiac inflammations are likely to be especially serious in young children: (1) the frequency with which both the endo- and pericardium are involved; (2) the great tendency to acute dilatation; (3) the liability of these attacks to be complicated by pneumonia.

The cardiac muscle, like the voluntary muscles, in young children, has by no means the resistance which it attains in later life; as a consequence of this, it happens that under the strain of an acute inflammation, dilatation comes on very readily and progresses more rapidly than in adults. The danger of dilatation is much increased in cases complicated by pericarditis. It is largely owing to rapid dilatation that we see so many cases succumb during the acute attacks, and it is usually in consequence of progressive dilatation that cardiac failure with dropsy and all its attendant features so often follows within a few months after the primary attack.

It is this condition of the heart walls which must be the chief consideration in the treatment of acute attacks, not only during the period of active inflammations, but for a considerable time afterward. I have long been of the opinion that if we

would minimize the injurious effects of acute endo-pericarditis, we must secure to these patients as nearly absolute rest as is possible; and that, not simply for a period of two or three weeks after acute symptoms, but for as many months.

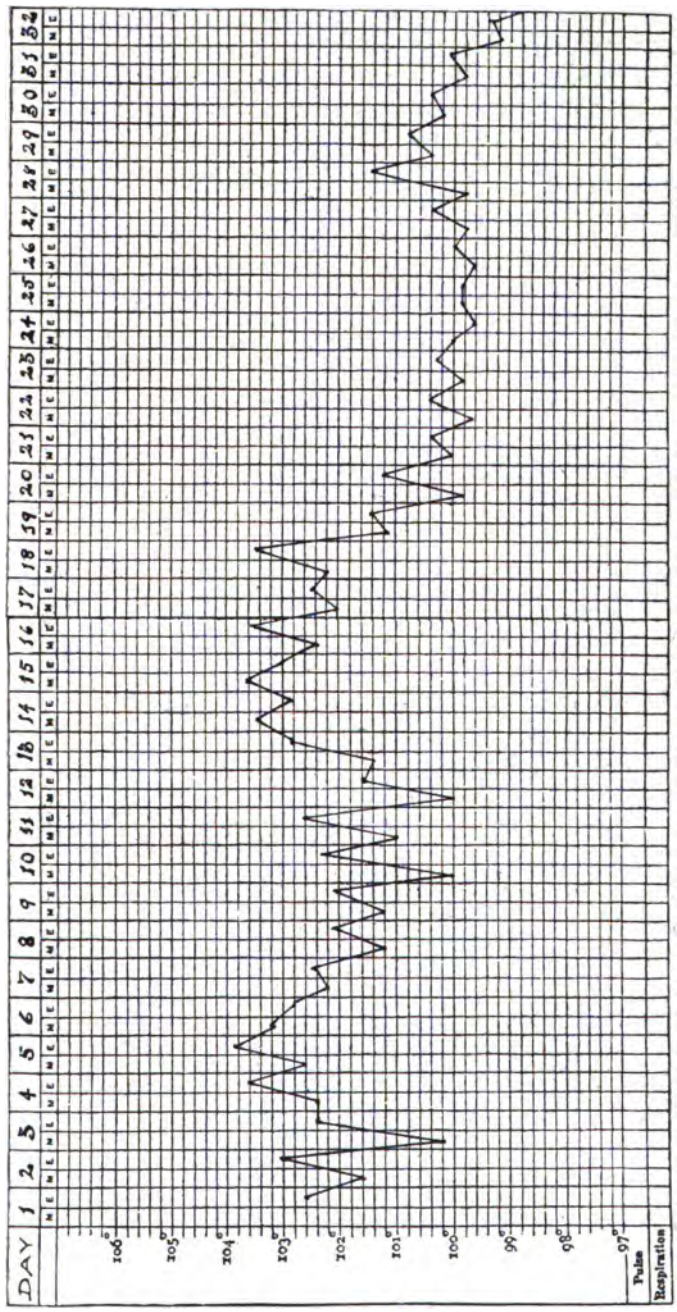
With adults the amount of work required of the heart may be pretty well regulated after the patient is sitting up or even walking about. With children, however, it becomes a practical impossibility to control or regulate the amount of exertion when once they are allowed out of bed. With them, therefore, if rest is to be secured at all, it can be accomplished only by strict confinement to the bed and in a recumbent position. This must be continued long enough for the heart to regain its tone and for a readjustment of the circulation to take place. In practice, I have not found this as difficult in any case as had been anticipated.

The two cases whose histories are given below, illustrate in a striking way the benefit resulting from this plan of treatment. They are selected as representing types of most serious inflammation affecting both the endo- and the pericardium; both were complicated with pneumonia and both were nearly fatal in the acute stage. The third case illustrates only too well what is so often seen to follow where children after acute heart inflammations are allowed to be up and about as soon as their general symptoms permit. All of these cases were observed in private practice and all were living under circumstances which made possible anything and everything which the patients required.

CASE I.—*Acute rheumatism; endo-pericarditis; two attacks of pneumonia: condition of the heart two and a half years after the primary attack.*

C. D., male, three and a half years old, a private patient living in the best surroundings; under close personal observation since infancy. Never any previous illness of importance. Family history strongly rheumatic; the mother, an older brother and sister had suffered from repeated attacks of acute or subacute articular rheumatism.

The boy was taken on March 9, 1897, with chilly sensations, vomiting and high fever. He was seen on the following day with a temperature of 102.5° F., and seemed much prostrated, but a careful physical examination gave no clue as to the



RANGE OF TEMPERATURE IN THE CASE OF C. D.

cause of the constitutional symptoms. On the third day, the temperature having continued, an eruption of urticaria appeared upon the hands and thighs, and this on the following morning gave place to quite a remarkable erythema, which occurred in large patches of symmetrical distribution, especially about the knees, ankles, abdomen and back. The larger patches were somewhat larger than the hand, and the smaller ones scarcely an inch in diameter; all were sharply circumscribed, and all of the same dark, purplish color, looking almost hemorrhagic. This eruption faded after two or three days, changing to a coppery hue before it disappeared. Coincidently with the eruption there occurred pain, tenderness and swelling of the large joints of the left lower extremity, and on the next day the joints of the right side were also affected.

On the fifth day of his illness a distinct systolic murmur was heard for the first time at the apex of the heart. The temperature is shown on the accompanying chart.

The early part of the second week of the illness was characterized by a gradual subsidence of the articular symptoms, slowly falling temperature, and improvement of the general condition; but the cardiac murmur persisted and became gradually more and more pronounced. The urine was highly acid, and contained traces of albumin, and there were frequently recurring outbreaks of urticaria. The treatment so far had been salicylate of soda, given in as full doses and as regularly as the stomach would permit, and a sufficient alkaline salt to overcome the high acidity of the urine. As much as gr. vii. of the citrate of potash was required every two hours to produce this effect. The lungs thus far had been normal.

On the thirteenth day a sharp rise in the temperature occurred, with considerable dyspnœa, which was explained two days later by the development of acute pericarditis, and subsequently by pneumonia of the left lung. Loud pericardial friction sounds were heard over the upper half of the cardiac area. The prostration now became marked, and the pulse, which had previously ranged from 110 to 125, rose to 140. The stomach became so irritable that all food and almost all medication had to be interrupted, and the general symptoms were most disquieting.

On the sixteenth day (March 25th) a small area of pneumonia was discovered at the left base behind, which rapidly extended

until nearly the entire lower lobe became consolidated. For the next week the pneumonia became the most important condition, and the child remained in a very critical state. Nothing but a little bovinine and whiskey could be retained in the stomach, and he was kept alive chiefly by the use of oxygen, which was given almost continuously.

The heart's action became very weak and at times irregular; the pulse ranged from 140 to 150, and the whole precordial space throbbed violently under the laboring action of the heart. There was now a double murmur at the apex; steadily increasing dilatation was evident, the apex beat being now one-half inch to the left of the nipple. For three or four days it did not seem possible that the heart could continue to hold out against such odds. But gradually at the end of the third week things took a turn for the better, and slowly there was improvement, first in the general symptoms, and a little later signs of resolution appeared in the lung. Things progressed quite favorably for the next three or four days, and the signs of consolidation had entirely disappeared; but on April 5th, without any assignable cause, the temperature again rose, pulse increased to 154, respiration ran up to 60, and for the second time the left lower lobe became almost completely solidified.

During the next four days his condition was worse than at any previous time during his illness. Food had to be practically discontinued on account of the irritability of the stomach, and only the smallest quantity of stimulants could be retained. Oxygen was given constantly and strychnine and digitalin pushed as far as possible. He had now become greatly wasted; respiration ranged from 60 to 70; there was extreme pallor, great muscular feebleness and almost every day two or three attacks of syncope. Gradually he rallied from this low condition, and by April 11th, for the second time, resolution was well under way in the lung, while the clearing tongue and returning appetite indicated an improvement in the digestive organs. It was really remarkable to see how the heart stood the strain of this second attack of pneumonia. The dilatation increased steadily, and the organ labored hard to keep up the circulation, but the odds were so great that on several occasions it would seem that the heart could not maintain the effort. Once or twice, even after there was marked improvement in the lungs, attacks of syncope came on. in one of

which, I think, he would have died but for prompt and energetic stimulation.

It was not until the end of the fifth week of his acute symptoms that there was really any continuous improvement. The apex impulse was now ¾ inch to the left of the nipple and about the same distance below the mammary line. The pericardial friction sounds had disappeared, but there was a double murmur at the apex, the systolic one being loud enough to be heard over the whole left chest in front and behind. The impulse was heaving, but the pulse most of the time continued regular. From time to time during the next week or two, slight articular manifestations of rheumatism occurred, but they were not severe nor persistent.

After this time the progress toward recovery was rapid. The digitalin was continued until the 10th of May, and after this only strychnine used. Even during this first month a marked change took place in the heart. The apex beat receded until it was nearly in the mammary line, although there was no change in the murmur. No dropsy had been present at any time. The lung had entirely resolved. Up to this time the child had been kept absolutely flat on his back, not being allowed even to raise his head.

On May 12th he was taken out of doors for the first time in a rolling chair, still being kept entirely recumbent. This was continued daily; but it was not until the 1st of July that he was allowed to sit up, and not until August to put his foot to the floor or take a step.

On July 1st he was taken to the country and kept there nearly three months, for the most of the time being in the open air, lying flat in his rolling chair. No return of the rheumatism and no symptoms referable to the heart occurred during this period.

I examined him again carefully on October 1st. He was apparently in as good physical condition as ever in his life. He had grown fat, strong and was no longer anæmic; the pulse was regular and from 104 to 110 a minute. The apex impulse was now one half inch *inside* the mammary line and only one-half inch below the nipple. The systolic murmur was still heard at the apex, but it was not loud, and audible only over the heart and at the angle of the scapula behind. The presystolic murmur had entirely disappeared; no trace of pericardial friction sounds could be heard, and lungs, liver and spleen were normal.

During the succeeding winter he was gradually allowed

more and more liberty in the way of exercise, and was permitted to walk in the street and about house on the level, but not to go up and down stairs without assistance.

June 1, 1899.—It is now over two years since the acute attack. The boy has been kept under close observation and heart carefully examined at short intervals during this period. For more than a year no restraint has been placed upon the child's activity except that of avoiding violent, romping play. He runs about, goes up and down stairs, rides a tricycle and, in fact, does almost everything that any six-year-old boy does, and without the slightest inconvenience of any kind. The apex beat remains fully one-half inch inside the mammary line and in the fifth space. No unnatural impulse in the cardiac region is noticed. The murmur has become much less distinct, but it is still easily recognized. There has been no dropsy and no return of rheumatic symptoms. At no time has the child complained of the slightest discomfort which could be attributed to his heart. The general health has remained good with the exception of a chronic indigestion during the past spring, which continued for over two months, and, although he lost several pounds in weight, became very pale and excessively nervous, his heart stood the strain remarkably well. It was carefully watched and with a good deal of anxiety, but did not seem to be affected in the slightest degree. He is now well-grown and considerably above the average both in height and weight for his age.

November 13, 1899.—I examined him to-day for the first time since the summer. There has been no striking change since June, except that the murmur is much fainter and behind is heard only with difficulty. The apex beat remains in the same situation. He never complains of his heart, though he is of an active, restless temperament and never quiet. He is gaining rapidly in height and is somewhat paler than usual, but otherwise in excellent health, and has had no rheumatic symptoms since his primary attack.

CASE II.—*Pericarditis with effusion; endocarditis; two attacks of pneumonia; malaria: condition of the heart twenty-one months after the acute attack.*

E. P., eight years old; female. Seen in consultation with Dr. W. H. Risk, of Summit, N. J., February 3, 1898.

The family history was strongly rheumatic on the mother's side, and a younger sister of the patient had died two years

before of an acute rheumatic endocarditis and complications. The patient had always been considered a rather delicate child, but she had never suffered from any of the ordinary infectious diseases. The present attack was preceded about a month by an irregular fever which was regarded as malarial and which continued for two weeks. After this she was well enough to go out coasting on January 29th. This exposure, however, was followed by a high fever, which marked the beginning of her illness, and the child from that time had been kept in bed. During the five days preceding my visit the temperature had ranged from 101° to 104°; the only other symptoms were great restlessness, marked prostration and a short, teasing cough.

On examination I found a pale, thin girl with considerable dyspnœa, the respiration accompanied by a short expiratory moan; temperature, 103.6° F.; pulse, 136 and weak; respiration, 50. Her general appearance was that of a child who was very ill. Over the left chest in front there was marked dulness extending outward nearly to the axillary margin; above, to about the second intercostal space; below, to about the fifth space; to the right, a little beyond the median line. This region of dulness was sharply outlined, and over the upper portion of it a very loud pericardial friction sound was heard over a circumscribed area. A loud double murmur was heard at the apex of the heart, and at the angle of the scapula, left side, a single, systolic murmur. The respiratory sounds in front over the area of dulness, were absent; behind bronchial breathing was heard over a small area at the middle of the lung, near the spine. This was also dull on percussion. There were no râles in the chest in front or behind. The right lung was normal; other organs normal.

A diagnosis was made of mitral valvulitis and pericarditis with effusion. The pulmonary signs heard posteriorly in the left lung regarded as due to pressure. The treatment was salicylate of soda in full doses, digitalis and small doses of morphine.

I saw her again five days later. A striking improvement had taken place both in the general condition and in the local symptoms. The pulse now ranged from 90 to 104. The temperature had gradually fallen, and on the day previous to my visit it had been normal both morning and evening. Pericardial friction sounds were still present but not so distinct as at the first examination. There was only a single murmur at the apex

but this was transmitted to the left and heard distinctly behind. The area of dulness anteriorly was much smaller and respiratory murmur in the region more distinct. A few râles were heard in front toward the margin of the axilla, and behind where formerly there had been pure bronchial breathing the lung was filled with moist râles, indicating that probably the signs previously present had been due to a pneumonic consolidation and not to pressure. A few coarse râles upon the right side.

The general improvement in all the symptoms continued for nearly a week after which time she was regarded as convalescent; but on February 13th, without any apparent cause the temperature again rose to 102.5° and with this there was cough, dyspnœa and sharp thoracic pain. I saw her for the third time the following morning and made out a small area of pneumonia at the extreme base of the left lung behind. Examination of the heart showed that a good deal of dilatation had already taken place. The apex beat was one inch to the left of the mammary line and three-quarters of an inch below the level of the nipple. The area of cardiac dulness, however, did not extend beyond the border of the heart. No pericardial friction sounds were heard and fairly good respiratory murmur was now present at the upper part of the left lung in front, where in her first acute attack there were no breathing sounds. There was no evidence that any increase in the heart inflammation had occurred, but the rise of temperature and other symptoms seemed entirely explained by pneumonia. The child had become greatly wasted, very irritable and extremely anæmic.

From this second attack she rallied quite rapidly; the temperature gradually fell but did not quite reach normal. The pneumonia resolved in a few days.

On February 19th, a third exacerbation in the temperature occurred without any evident explanation. I saw her again on the 21st and was surprised to find improvement both in her general condition and in the heart in spite of the persistence of the fever which ranged from normal to 104.5°. The lung had cleared with the exception of a few coarse râles; the apex beat was now an inch to the left of the nipple, and one and one-fourth inches below. Pulse, 110 to 120.

I did not see her again until March 2d, but the irregular high temperature had continued. It did not seem possible that this could be due to the cardiac lesion, as the physical signs in-

dicated steady improvement here. The spleen could now, for the first time, be made out by palpation and an examination of the blood showed many malarial organisms. Quinine was now begun in full doses; improvement soon followed and the temperature gradually fell to normal. From this time convalescence was uninterrupted.

I did not have another opportunity to see the patient until eight months later, when she was brought to my office, January 15, 1899. I had, however, been kept informed by Dr. Risk regarding her condition. The same general plan had been followed as in the previous case. She was kept in bed for two months after all febrile symptoms had disappeared. This did not seem to affect her general health unfavorably; not only did her heart improve, but she gained steadily in weight, so that when she got up she weighed six pounds more than before she was taken ill. During June she was allowed to sit up part of the day and take short drives; and during July, for the first time, she was allowed to walk. The exercise was carefully and gradually increased during the summer, and by the late autumn she was able to go up and down stairs without the slightest discomfort, and seemed to be in every way normal.

The summer was spent in Vermont at the elevation of 1000 feet without inconvenience, and she improved steadily throughout the season. At no time during the summer was there any return of the rheumatism or any symptoms complained of referable to the heart. At her visit to my office she came skipping into the room in the highest of spirits, with rosy cheeks, and in every way was in excellent physical condition, hardly recognizable as the invalid of the previous winter. The pulse was 100, full and regular. The apex beat in the mammary line, and ½ inch below the level of the nipple. A soft systolic murmur was heard at the apex, but it was faint, not loud enough to be heard behind. No increase in cardiac dulness; no pericardial friction sounds. Lungs normal.

She did not suffer the slightest inconvenience on account of her heart, and it was difficult for one seeing her at this time to believe that she had had so serious a lesion as the one observed only a year before.

November 13, 1899.—She came in for examination at my request. With the exception of a slight diarrhœa last summer she has not been ill since the last note. She leads quite an

active life, rides her pony, runs about and plays pretty much like other children. No return of rheumatism, and no cardiac symptoms since the last examination. The position of the apex beat is unchanged. It is only by the most careful auscultation that any murmur can now be detected. It is very faint and is heard only in the neighborhood of the apex, not at all behind. The pulse is full, strong and regular. The child's development is in every way most satisfactory. Her general health is excellent; she has in fact been better and stronger since than before her serious illness.

I have given the histories of the cases considerably in detail in order that the type of the disease might be appreciated. The strain upon the heart during the attack of pneumonia in the little boy of three years (Case I) was so great that I did not expect him to recover. The second patient, though at no time so desperately ill, was for a week in a very critical condition, and her cardiac lesion seemed to be quite as serious as that of the little boy.

Had either of these patients been allowed to get up soon after the acute attack I feel very sure that the outcome would have been very different. As an illustration of such a practice I will give the history of another patient whom I saw last year.

CASE III.—*Endocarditis complicating pneumonia; death seven months after the initial attack from progressive cardiac failure.*

G. O., female, eleven and one-half years old; first came under my observation December 24, 1898. No rheumatism in the family; the patient was the robust member of the family and previous to July of the same year had never been seriously ill. At that time she had an acute lobar pneumonia of the left lung and was seriously ill for two weeks. The pneumonia was chiefly in front; involvement of the heart was recognized during the acute attack. She was, however, kept in bed only two weeks. In a few days she was allowed out to drive; and shortly after she was taken to the Adirondacks where she spent the balance of the summer. She was allowed to walk about the place, but not to engage in active exercise, and spent most of her time in a boat.

Dr. S. K. Bremner, who examined her early in August, soon after she came to the Adirondacks, reported the condition to me at that time as follows: the apex beat was over an inch to the

left of the nipple and a very loud mitral regurgitant murmur was present.

Her general condition during the summer continued apparently good. But in September she had a short malarial fever; and in November a mild attack of grippe. During both of these she was a good deal prostrated, making a tardy recovery, and suffered from considerable cardiac embarrassment. Except when acutely ill, she had been allowed to be up and about the house, and drove out nearly every day, even up to a few days before my first visit. She also walked somewhat upon the level, but seldom up and down stairs. Early in December a slight dropsy or the feet and ankles was first noticed.

At my first examination there was noted a heaving cardiac impulse; the apex was 1¼ inches to the left of the mammary line and two inches below the nipple. The heart's action was labored and the sounds somewhat confused, but there was a loud systolic murmur at the apex, which could be heard all over the chest in front and over the left chest behind. Near the apex there was heard over a small area a presystolic murmur. The pulse was 120 and somewhat irregular; the face considerably, and the feet slightly œdematous; lungs normal; spleen and liver not enlarged; no fluid in the peritoneal cavity.

For the first ten days under absolute rest and the free administration of digitalis some improvement occurred and the dropsy disappeared; but after a short interval in spite of everything that was done the case went steadily downward. The dropsy in the face and lower extremities returned early in February; the liver and spleen became very greatly enlarged, and she finally died with general anasarca, from cardiac exhaustion and pulmonary œdema on February 22d, two months after I first saw her and a little more than seven months from her first cardiac symptoms. No autopsy.

This girl belonged to a very healthy family, was of strong constitution and lived in the very best surroundings. She was a highly nervous, strong-willed child and was very difficult to control.

These cases teach their own lesson, and comment seems almost unnecessary. I firmly believe that in few things are physicians more blameworthy than in allowing children to get up as soon as acute symptoms have subsided, after they have suffered either from acute cardiac inflammations or from general

infectious diseases (especially diphtheria, scarlet fever or typhoid), of severe type and in which the heart muscle has been affected. The possibilities of harm which may result from this practice are certainly not appreciated. Nor, on the other hand, are the possibilities of improvement or the extent of recovery appreciated, where the plan of treatment above outlined has been followed.

14 WEST FIFTY-FIFTH STREET.

A CASE OF HEART LESIONS.

BY A. C. COTTON, M.D.,

Professor of Diseases of Children, Rush Medical College; Accoucheur and Attending Physician, Diseases of Children, to Presbyterian Hospital; Member of Staff of Central Free Dispensary; Member of Staff of Cook County Hospital; Lecturer to the Illinois Training School for Nurses; President of the Chicago Pediatric Society.

Edgar Lapointe, Canadian. Aged eleven years, nine months. First brought to the clinic August 2, 1898.

FAMILY HISTORY.—Parents both living. Father has had good health. Mother has had rheumatism. She has had seventeen pregnancies, three of these resulting in premature birth. Of the fourteen born alive, six are now living and, with exception of patient, are now in good health. Causes of death of the others—meningitis, scarlet fever and diphtheria.

PERSONAL HISTORY.—The patient was a strong, healthy baby until four months of age, at which time he had an attack of pneumonia. The mother positively asserts that he never showed any signs of blueness during these first months of existence.

The pneumonia was followed by diphtheria, mumps, measles, bronchitis, pertussis, varicella, typhoid and scarlet fevers. He was ill continuously until three and one-half years old ; did not walk until four years of age. Since then he is reported to have grown well and strong and was considered to be fully as healthy as a child could be. Repeated questioning failed to elicit any information of evidences of cyanosis or œdema. The only exception to this perfect health was the occurrence, three years ago, of a severe and prolonged attack of epistaxis that necessitated plugging of nostrils before controlled. Since then slight causes have been sufficient to produce recurrences of the hemorrhage.

PRESENT ILLNESS.—Began gradually the latter part of June with dyspnœa on exertion, palpitation, loss of strength and de-

sire to play. No history of tonsillitis, pain in joints, nor any suppurating focus can be obtained.

STATUS PRÆSENS.—Average build for a child of eleven years. Emaciation. Pallor of skin and mucous membranes. *No cyanosis.* Skin dry and scaling. Petechiæ on legs. Finger tips somewhat clubbed. Œdema of face and feet.

HEAD.—Negative. Pupils equal and react to light and accommodation. Pupils show no eccentric arrangement. No anomalous development of ears. Tongue coated.

NECK.—Slight enlargement of thyroid. Venous pulsation. Carotids poorly filled and of diminished tension.

CHEST.—Inspection—Flaring of rib arch. No noticeable restriction or change of respiratory movement of either side.

Percussion—Right, anteriorly—Apex diminished resonance. Below apex normal resonance to fifth rib. Absolute dulness begins on sixth rib. Lower border of lung descends in inspiration.

Left, anteriorly—Resonance to the second interspace. Absolute dulness begins on third rib. Lower border movable with inspiration.

Posteriorly—Both lungs resonant. Both lower borders movable with inspiration. Lower border at tenth dorsal vertebra.

Auscultation—Vesicular breathing over both lungs.

HEART.—Inspection—Apex beat in fourth interspace, one finger's breadth outside mammillary line. Pulsation of lower portion of sternum and epigastrium.

Palpation—Apex beat in fourth space and a finger's breadth outside nipple. Marked systolic thrill, also felt over lower part of sternum. It increases in intensity toward the base and reaches its greatest intensity in the second interspace to the left of the sternum.

Percussion—Upper border—absolute dulness at third rib. Right border—at level of fourth rib, two fingers' breadth to right of right sternal border. At level of fifth rib, two and one-half fingers' breadth to right of right sternal border. Lower portion of sternum very dull. Left border corresponds to apex.

Auscultation—Harsh systolic murmur heard all over the chest but loudest in second left interspace. At this point the second sound is not distinguishable.

ABDOMEN.—Inspection—Bulging in epigastric region.

Palpation—Lower portion negative. Upper portion—Liver palpable fully three fingers' breadth below costal arch. Surface smooth. Spleen palpable and firm. No friction rubs to be felt.

Percussion—Confirms palpation. Pulse 120, temperature 103° F., respiration 30.

In clinic the diagnosis of endocarditis was made at the first visit to the clinic and, though there was no history of pain in joints, yet as rheumatism in children may affect the endo- and pericardium without any other manifestations, he was put on salicylic acid and cathartics, with directions to keep in bed, and for a simple diet.

During the next two weeks he was seen several times. Some rise of temperature was always present. August 11th, we first noticed a cough of a dry, harsh character.

Wishing better care for the child and closer observation of the symptoms he was admitted to the Presbyterian Hospital August 15th. He was homesick and ran away the evening of August 16th. The following day œdema of ankles was greater, cough more troublesome and heart's action weaker.

August 19th.—Temperature 104½°; pulse 110; respiration 38. No chills nor sweating. Fine râles over both lungs.

August 22d.—He was seen in consultation with Dr. Edwards, whose diagnosis was infective endocarditis.

August 23d.—Temperature 104⅘°. Friction sounds on right side both anteriorly and posteriorly. Has sharp pain in right side. Cough more frequent.

From this time on to the end the case progressed with occasional apparent improvement to be followed by exacerbations. During these attacks the cough became frequent and fine and medium sized râles were heard over both lungs. Sputum was always scanty, never streaked with blood. Examinations of sputum for tubercle bacilli were made during September and October, with negative results.

Examination of blood on September 7th. Hemoglobin 40 per cent. Red cells 2,640,000. White cells 12,330.

Examinations of urine made at intervals of every ten days showed a low specific gravity but otherwise was negative until October 1st, when there appeared a trace of albumin. Each specimen tested after this showed an increasing amount.

There was little change in the heart findings. The venous pulsation became more marked. The last two weeks there

was noted pulsation of lobes of ears. This was synchronous with the carotid beat, but light pressure below the lobe of ear caused its throbbing to cease, to appear again on removing pressure—in other words there was a positive venous pulsation.

About the same time the apex beat became more diffuse and its impulse fainter.

The first week in October he complained of toothache. October 5th the second temporary and first permanent molars were extracted. Both had pus sacs at roots.

October 11th.—Toothache continues. Gums inflamed.

October 16th.—Cavity left after extracting teeth has not filled in. Necrosis of gums.

October 19th.—Sloughing of soft tissues reaches nearly to median line and backward to soft palate. Left side of face greatly swollen. Eye closed. Waxy appearance of skin. Odor gangrenous. Appetite better than for past two weeks.

October 21st.—Sloughing has extended across median line. Buccal surface of left cheek reddened. Profuse discharge from left nostril, considerable from left ear. Œdema has extended around neck. Appetite continues good and deglutition is not painful or difficult. Several masses of dead tissue from mouth were dissected away each day.

October 22d.—Left eye discharging pus.

October 23d.—Swallowing slightly difficult. Discharge from left nostril, eye and ear.

October 24th.—Died rather suddenly at 2.30 P.M.

CLINICAL DIAGNOSIS.—Infective endocarditis.

Pulmonary stenosis.

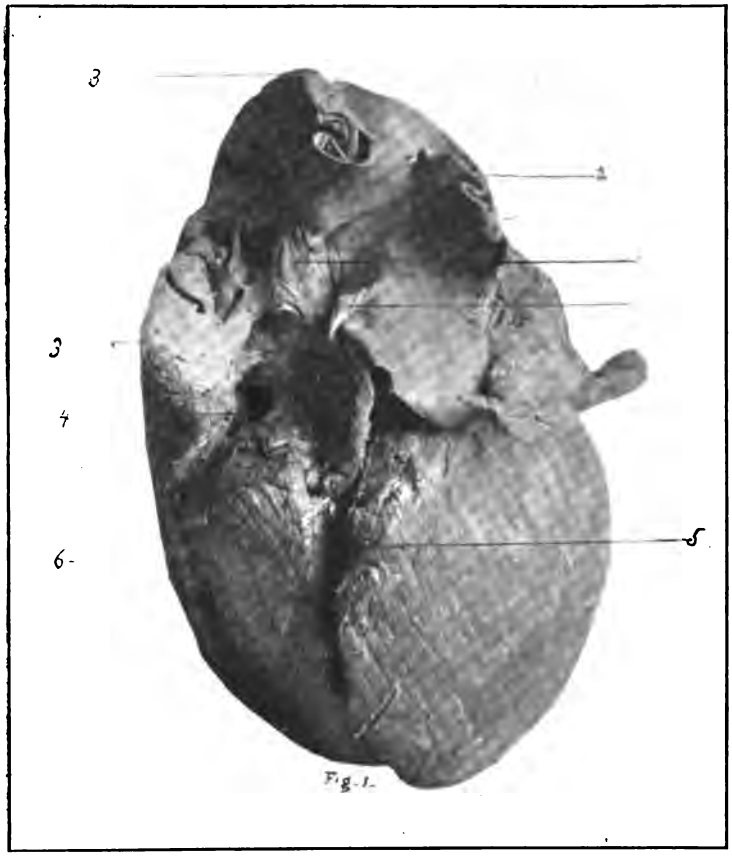
Stomatitis gangrenosa.

NECROPSY BY E. R. LE COUNT,

Assistant Professor of Histology and Pathology, Rush Medical College.

The body is very pale, with a greenish discoloration of the lower part of the abdomen. A puncture (*post-mortem*) wound is present one inch to the left of the navel. The palms of the hands are œdematous. The lids of the left eye are matted together by a sticky secretion, and there is a marked exophthalmos of this eye. The subcutaneous fat exposed by the median

incision is scanty and œdematous. The diaphragm extends upward on the right side to the fifth rib, and on the left side to the fifth interspace. The bladder is distended with clear urine. The peritoneal cavity contains a considerable quantity (from two

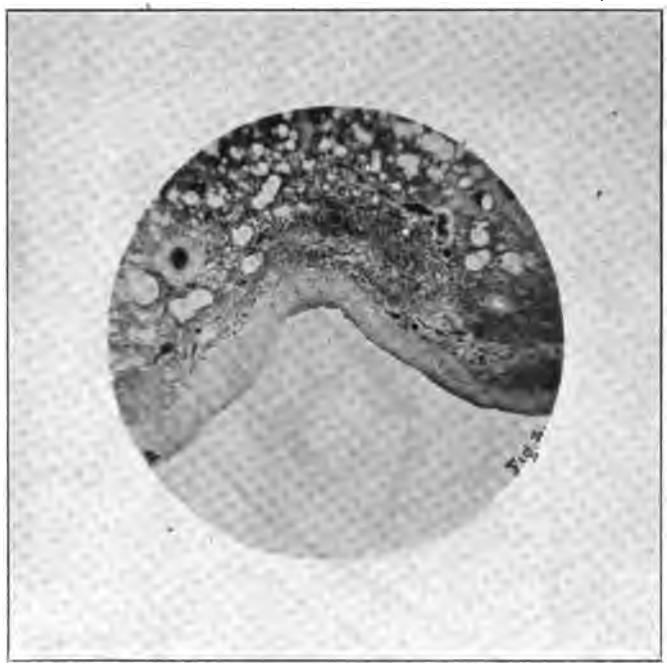


HEART AS SEEN FROM ABOVE AND THE RIGHT.

1. 1. CUSPS OF PULMONARY VALVE.—2. PULMONARY ARTERY CUT OPEN AND LYING OVER THE AORTA.—3. 3. CUT EDGES OF THE ANEURYSM IN THE WALL OF THE RIGHT VENTRICLE—THE CAVITY OF THE ANEURYSM LIES BETWEEN THEM.—4. STENOSIS OF THE PULMONARY CONUS.—5. INCISION INTO LEFT VENTRICLE.—6. INCISION INTO RIGHT VENTRICLE.

to three pints) of a clear fluid. Adhesions which are easily broken, occur about the spleen. The pleural cavities are each about one-half filled with a clear fluid. The gall bladder is distended with thick, dark bile; its mucous membrane is œdemat-

ous, and its cavity is uninterrupted. The sigmoid flexure reaches in a distended coil upward and to the right, to a point opposite the navel. The ureter on the right side is dilated to the size of a lead pencil, the walls being thin. The back of the tongue is of a grayish-black color. The tonsils are both atrophic and pigmented, being of a slaty-blue color. The musculature of the tongue is dry and pale. The œsophageal mucosa is ivory white and smooth. The larynx and trachea possess linings covered

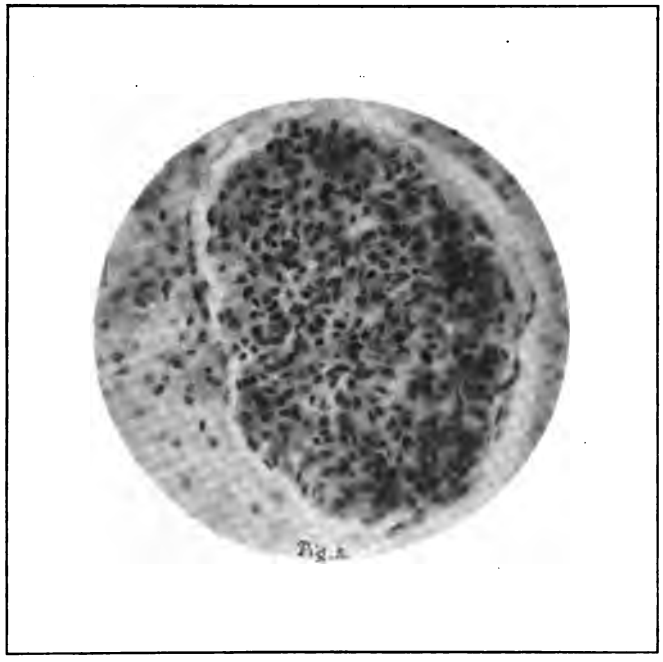


FIBROUS WALL OF A HEALED SEPTIC INFARCT (METASTATIC ABSCESS). +15.

with a frothy, greenish mucus. The pericardial cavity contains a quantity of clear, opalescent fluid.

THE HEART measures 10 cm. across the base, 9.5 cm. from the base to the apex, and 5.5 cm. in thickness. It weighs 170 gm. Both the mitral and tricuspid valves admit three finger tips. The aortic and pulmonary valves appear competent to the water test. The mitral cusps exhibit no changes. The posterior cusp of the tricuspid valve is thickened along its free margin.

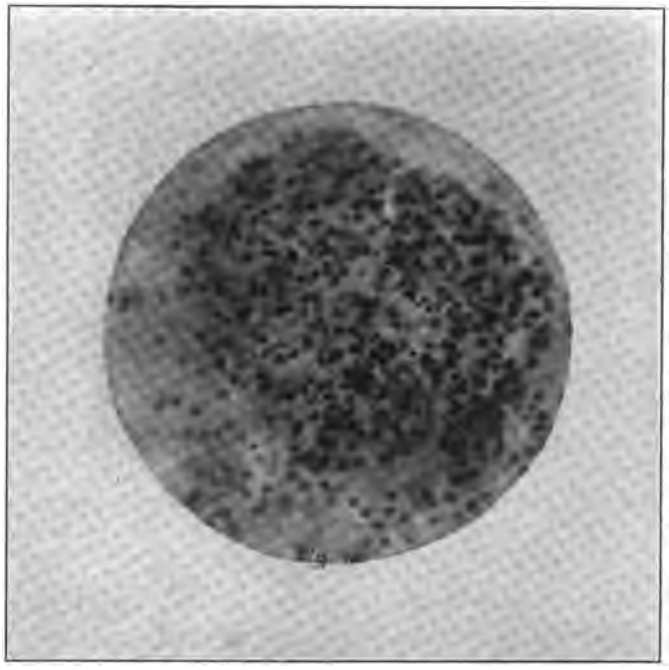
There are no changes about the aortic valves, except that all three cusps show slight fenestration of the margins. Below the aortic valves in front and above the interventricular septum is a pouch which easily contains the bulbous tip of a finger, and is from twelve to fourteen millimetres in diameter. At the bottom of this pouch is a small hole, two millimetres in diameter, through which a probe can be passed into the right ventricle, where it emerges just below the stenosis in the conus, and just



A SINGLE GLOMERULUS SHOWING A GREAT EXCESS OF NUCLEI. (+250.)

below the tricuspid valve. This pouch lies in the "unprotected space." The endocardium on the septum below the pouch, (left ventricle) is thickened and of a whitish color. The left ventricle measures 6.5 cm. long; the wall averages 12 mm. The right ventricle shows near its upper left-hand corner, just below the pulmonary valve, a stenosis of the conus. This opening measures 9 mm. in diameter and approximately 2.5 cm. in circumference. This stenosis is 14 mm. below the pulmonary cusps, of which there are but *two.* Below these cusps and

between the pulmonary valves and the point of stenosis in the conus is a cavity extending outward in the heart wall. It extends for a distance of 3.5 to 3.8 cm. forward and to the right in the wall of the right ventricle. With the heart unopened it lies in front of the large vessels. Its walls are thin, covered with a whitish, smooth lining. It is crossed by numerous bands of myocardium which resemble the trabeculæ of the ventricular walls. Among these trabeculæ is a quantity of whitish



A SINGLE GLOMERULUS SHOWING A NECROTIC AREA IN THE LOWER RIGHT CORNER. NECOTIC. (+250.)

and yellowish-gray, clotted blood, somewhat adherent in places, and which in some spots leaves a rough surface when it is removed. The wall of this aneurysmal sac at its thinnest point measures 2 mm. The right ventricle measures 6.5 cm. in length and its wall averages from 12 to 14 mm. in thickness. The foramen ovale is closed. The right auricle is dilated and its walls appear thickened. No sign of a ductus botalli were found, nor any changes in the pericardium nor in the coronary vessels.

LEFT LUNG.—Over the lower lobe is a delicate, fibrinous exudate. At the margin of this lobe, below and laterally is a small area of consolidation, which on section shows a cavity filled with grayish-yellow pus. There are also areas of consolidation, minute and buckshot sized, which contain a dry, yellowish, granular material. There are no changes in the surrounding lung tissue, aside from a wall formation. At the upper part of this lobe there is an area of consolidation somewhat wedge shaped, and reddish on section, which shows at the bottom a thrombosed vessel. The thrombus is occluding and grayish-yellow in color, and is adherent. In the apex of this lung is an old cavity, the size of a walnut, containing gas or air, which collapses on pressure. It is provided with a definite, fibrous wall, a somewhat trabeculated cavity ; there are no changes in the surrounding lung tissue. Also in the upper lobe are some nodules, similar to those in the lower lobe. The right lung possesses a fibrinous exudate external similar to that on the left lung. In the lower border of the right lower lobe is an old cavity with smooth walls. It is empty. There are no changes in the surrounding lung tissue. The middle lobe shows no changes. The upper lobe, in the apex, possesses a cavity, similar to but smaller than that in the left upper lobe. Deeper in the right upper lobe is a similar, but larger cavity. Both lungs float, both are pinkish in color and crepitation is fair. The glands at the roots of the lungs are enlarged, are dark reddish in color; they show no caseous areas, and only slight blackening by coal pigment.

THE LIVER measures 21.5, 15., 11.5, cm., and weighs 950 g. On section it presents a mottled appearance, with rather gross yellowish areas. It is soft and the lobular markings are distinct.

THE SPLEEN.—This is 15.8 cm. long and 8 cm. wide and 4.5 cm. thick. There are fibrous tags on the capsule, externally. On section it is soft. The Malpighian bodies, which are very numerous, are large and whitish in appearance. Weight 290 gm.

THE KIDNEYS are equal in size, weighing together 315 g. and measuring 11.5, 6.5, 4.5 cm. The left kidney is practically bloodless. The fat of the pelvis is œdematous. The capsules are easily removed. The cortex of the left kidney is pale and of

a glossy appearance. The cortical markings are quite distinct. The glomeruli project as pale bodies.

THE BLADDER has a pale mucosa ; a fibrous nodule, 12 mm. long occurs at its apex. It is firm and whitish on section, and contains no cavity. No changes are presented about the prostate gland, nor the seminal vesicles.

The intestines, pancreas and other viscera showed no gross changes. Examination of the brain and left eye was not allowed.

ANATOMIC DIAGNOSIS.—Stenosis of the pulmonary conus.
Malformation of the pulmonary valve (2 cusps).
Aneurysm of the right ventricular wall.
Acute mural endocarditis.
Defective (perforate) ventricular septum.
Fibrinous pleuritis.
Old healed and recent metastatic abscesses of both lungs.
Cloudy swelling of the liver and kidneys.
Chronic splenitis, acute perisplenitis, general anæmia.
Anasarca, hydrothorax, hydropericardium, and ascites.
Embalming (undertaker's) puncture.
Panophthalmitis of the left eye.

MICROSCOPIC EXAMINATION.

The interesting changes centre in the lungs and kidneys. One of the small areas of consolidation from the left lung has undergone a marked necrosis in which all signs of alveolation have disappeared. This necrosis is irregular in outline and appears to have taken place in patches which have fused. In this necrotic tissue are medium sized blood-vessels which are completely filled with necrotic thrombi. The lung tissue around is consolidated by fibrillated cells and leucocytes which fill the alveoli. The firm fibrous walls of these cavities were examined and showed essentially the same features. The wall is made up of fibrous tissue which stains mainly with eosin, the cells in the wall are fibrillated and possess undulating ends ; there are also some cells with oval nuclei and some granules of blood pigment. The alveoli in the immediate vicinity are quite crowded with small oval or round cells and red blood corpuscles. The spleen

shows a superficial necrosis which includes the capsule and a narrow zone just beneath it. In this necrotic tissue is considerable fibrin. The spleen corpuscles contain a large number of red blood cells and in a few cells of the corpuscles proper the nuclear staining is deficient. In the kidney very striking changes are present in the glomeruli ; the nuclei present far exceed the normal, most of them are small and oval and it is difficult to outline the cell bodies ; almost without exception the glomeruli contain numerous cells which are very much fibrillated and drawn out into narrow necked projections. In addition to these features many glomeruli contain areas which are very reddish from the eosin staining and in such areas the nuclei are few and extremely distorted, such eosin staining areas occupy but a small portion of the glomerulus and are usually at the periphery; they are crescent shaped and sometimes so closely fused to Bowman's capsule that it is difficult to say whether they are due to changes which have taken place in a mass of cells which accumulated between the glomerulus and its capsule, or to changes in a portion of the glomerulus itself. Weigert's fibrin stain does not reveal any fibrin in these areas nor can bacteria be found by Gram's staining or other methods. Sections of the thyroid, adrenals, intestines, pancreas and heart muscle show no important changes. The liver contains "lymphoid nodules," the nuclei of the liver cells do not react uniformly to nuclear dyes, some staining much more darkly than others. A great variety of leucocytes (?) are present in the capillaries—for the main part these are mono-nuclear and exhibit changes of nuclear death.

BACTEROLOGIC EXAMINATION.—The streptococcus pyogenes was recovered from the lungs and the vegetations and adherent clots in and about the aneurysm of the heart wall. The colon bacillus and two micrococci, which could not be identified, were also obtained from the lungs.

677 JACKSON BOULEVARD.

DISCUSSION.

DR. PACKARD.—I would like to ask about the second pulmonary sound in this case. Great stress has been laid upon the accentuation of the second sound in such cases. Why it should be it is difficult to see, but it has been considered of marked diagnostic value.

THE PRESIDENT.—The point of the second sound interests me very much, for I had a pair of congenital malformations of this kind, and one of them had a very pronounced second sound perfectly characteristic, while the other had none. There was nothing but a peculiar dulness that threw us off our guard.

DR. COTTON.—This case was particularly interesting to me because I failed to make the diagnosis *ante-mortem.* It was examined by several excellent diagnosticians and Dr. Butler was the only one who made the diagnosis of pulmonary stenosis and stuck to it.

A CASE OF MULTIPLE OSTEOMYELITIS IN AN INFANT.

BY T. M. ROTCH, M.D.,
Professor of Diseases of Children, Harvard University,
Boston.

This case is presented as one of pathological rather than of clinical interest. A female infant, one month old, was admitted to the Infants' Hospital, November 16, 1898. The parents, who were Italians, were seemingly healthy and had one other child, a girl, who was also reported to be healthy. One week previous to entrance, what was described as a "red rash" appeared on the abdomen and spread down the left leg. It lasted about four days. Two nights previous to entering the hospital the infant had cried seemingly from pain on movement of the legs. There had been some discharge of pus from the umbilicus, which had never healed. The infant appeared to be well nourished and of good color, with no abnormal appearances, excepting that the umbilicus had not healed, and also that the lower third of the left thigh was swollen so as to be twice as large as the right thigh, and that the skin in this region was red and shiny. The left leg was held stiffly and somewhat flexed, the knee being bent almost at a right angle, and both in front and over the anterior tibial group of muscles, and over the calf, there was a brawny feeling without fluctuation or localized tenderness.

The diagnosis of cellulitis, and probably osteomyelitis was made by Dr. Augustus Thorndike, surgeon in charge of the out-patient department. The lesion of the skin was supposed to be the remains of an erysipelas. On the day following entrance the brawny infiltration was less extensive. The temperature, however, remained over 40° C. On November 19th a vertical incision was made from the inner side of the head of the tibia about four inches downward. This revealed a tibial abscess under the periosteum which was separated for two inches both in front and behind. The cartilaginous epiphysis was separated and freely movable, and the bone of the shaft was red, rough, soft and covered with small bleeding points. The upper

two inches of the shaft were removed, revealing what appeared like hard, healthy bone. A counter-opening was made in the calf, and after irrigation a sterilized dressing was applied. The temperature continued between 39° and 40° C. On changing the dressing in the afternoon, the lower surfaces of the upper epiphyseal cartilage looked gray and opaque, but at the next dressing several bleeding points were seen in the epiphysis and the wound looked well. A swelling had suddenly appeared over both malleoli, and an incision let out some greenish pus. A small area of the bone was curetted at this time. Some hours later a swelling had appeared over each wrist, which was drained by two incisions, one over each styloid process. No communication was found with the bare bone. The skin was also found to be pitting on pressure, and slightly reddened over the biceps.

On the following day, November 22d, the infant was found to be jaundiced. Fluctuation appeared, and the arm was freely opened from the coracoid process to the elbow. An opening was also made at the posterior border of the deltoid, as pus was discovered along the long head of the biceps. The shoulder was then irrigated and drained.

The cultures which were taken from each of these abscesses showed no growth excepting the one from the tibia, where staphylococcus aureus was found in abundance. It was afterwards found that this growth had not been found elsewhere because the oven where the cultures had been baked had been overheated.

On the following morning, the hand and arm were blue, cold and swollen. No pulse could be felt, and the tissues in the wound were almost black. The child died nine days after the first symptom of disease in the bone.

The autopsy was made three hours after death by Dr. William F. Whitney, pathologist of the hospital, and was interesting in that it showed no abscesses which could not be traced to multiple osteomyelitis. There was an almost entire absence of pathological changes in the viscera. A separation of the epiphysis had occurred at the lower end of the left tibia and fibula, the upper end of the left femur, the lower end of both radii and ulnæ, and the upper end of the right humerus, with softening of the bone and pus. No thrombi were found in the right axillary vessels, the whole right arm to the wrist being swollen and dis-

colored, and on cutting into it a red serous fluid flowed out of this phlegmonous inflammation. Cultures from the heart's blood, kidneys and liver, showed no growth, but from the hip joint and tibial marrow, there was an abundance of pure staphyloccus aureus, and from the phlegmonous arm a faint growth of streptococci. Blood serum was the culture medium.

The case shows a rapid septic infection confined to the bone marrow and bone of the shafts. Several long bones were affected, unaccompanied by any inflammation of the lymphatic glands or of the internal organs.

Pure cultures of staphyloccus aureus were obtained from the left tibia and hip, and as there was no discernible difference in the appearance of the three bones, it is probable that the same micro-organisms had existed in all the inflamed bones. The streptococcus infection of the arm was probably due to accidental inoculation at the time of the operation. The shoulder and hip joint contained pus, but the knee and wrist escaped. This is to be explained by the anatomical relation of the epiphysis to the capsule of the joint. When the epiphyseal line reaches within the joint capsule, pus can reach the joint, whenever the epiphysis is separated by suppuration, and this relationship existed in the hip and shoulder joints. In the wrist the capsule is inserted into the epiphysis of the radius and ulna, and not into the shaft, so that pus to reach the joint has to perforate the cartilaginous epiphysis. This is a more difficult thing than suppuration of the epiphysis. The same is true of the upper epiphysis of the tibia, for the capsular ligament of the knee does not cross the epiphysis, but is inserted into it; therefore, when suppuration occurs, the pus burrows under the periosteum, but does not break into the joint.

As to treatment there are two chief indications; first, prophylactic treatment which should be the prevention of septic infection of the cord and of the wound after the cord has fallen off. Second, where osteomyelitis of the shaft of a long bone is shown at operation, all of the affected portions should be removed, even if the entire shaft is taken, experience having shown that new bone will soon form, and that a serviceable limb is the usual result in the leg and forearm.

Acute arthritis of infants is osteomyelitis attended by suppuration in the joints. The joint infection may come either from separation of the epiphysis, which is wholly or in part intra-cap-

sular, or from a growth of pyogenic organisms along the blood or lymph channels of the epiphysis, frequently setting up osteomyelitis of the ossified portion of the epiphysis and spreading thence into the joints. The two affections, therefore, represent different phases of bone infection rather than different diseases of the bone.

According to Dr. Edward H. Nichols, who has written an excellent monograph on this subject, acute infectious osteomyelitis is (1) an acute inflammation of the bone due to any one of a number of pathogenic organisms, hence osteomyelitis is not a specific disease.

2. The staphyloccus pyogenes aureus is the organism that most commonly produces the disease.

3. An early period of development, and the exanthemata predispose to osteomyelitis.

4. Osteomyelitis generally attacks the shaft of the bone, while tuberculosis generally the epiphyses.

5. The process may attack the epiphysis and extend to the joint.

197 COMMONWEALTH AVENUE.

SCORBUTIC MEMBRANOUS COLITIS.

BY J. HENRY FRUITNIGHT, M.D.,

New York.

On the ninth day of February of the present year I was called to visit professionally J. B., aged nine years, for what his parents thought was rheumatism. The boy had had tenderness and swelling, but no redness, about the left wrist, left knee and right ankle joints. The appearance of an eruption in the neighborhood of the joints just named alarmed his parents and led them to call in medical advice. The boy was pale and rather puny, and not as well developed as he should have been. This was the more surprising as he was the child of a wealthy family who had abundant means to promote his physical welfare.

On examination I found the joints already referred to exquisitely tender to the touch and considerably swollen. The eruption alluded to was petechial in character, and was profuse near the joints involved. On closer examination, however, some petechiæ were also discovered scattered over different parts of his body. His gums were soft and spongy, and bled a little on pressure, though the buccal mucous membrane in general had an anæmic appearance. He had a temperature of 102½°, and his pulse was feeble in tension, beating 102 to the minute.

On inquiry it was elicited that the boy did not eat any vegetables or fruit, subsisting mainly on ham, bacon, bread, and coffee, although the table was abundantly supplied with all that the markets afforded. In explanation of this depraved appetite on the part of the boy, the father said that when he was about three years old the boy had had some affection of the digestive organs, which was accompanied by prolonged anorexia. The father said he had become discouraged, when finally the child began to eat of ham. When the child began to eat this the father became so elated that he encouraged the boy, and in this manner an appetite for this kind of food was created, the father

permitting the child to indulge its appetite in this direction ever since.

On the second day of my attendance the boy complained of a severe pain in the left inguinal region. The pain was so severe that he almost went into collapse. At the same time his temperature rose to 102° and his pulse became feeble and flickering. The pain was overcome by the administration of opiates, though at the time the exact cause of the pain could not be recognized. I neglected to say that the patient had been constipated. A simple enema of hot soap-suds and oil was administered. A free evacuation was secured, and with it came away a piece of pseudo-membrane about five inches in length and two inches in width, mucoid in character, dark red in color, and very friable. The abdominal pain ceased, and in a little while the temperature had fallen to 100°.

As a result of the examination of the patient on the occasion of my first visit, the diagnosis of scurvy was made, for the clinical history was certainly a characteristic one. The occurrence of the abdominal complication led me to add to this diagnosis that of scorbutic membranous colitis.

The treatment inaugurated when the patient was first seen was that which experience has established as the proper and efficient one for such cases. Fruit juices, particularly orange juice, was given in large quantities, and also beef juice. Medicinal remedies were employed only to palliate symptoms *pro re nata*. Improvement began very promptly, and in about a fortnight the boy was up and about. The family was much scandalized to think that a case of this disease should have occurred among them. I thereupon insisted that the boy should be compelled to partake of a mixed diet, embracing a large variety of fruit, vegetables and fresh meat, and that he be sent to the country for a long period. This was done, and to-day the boy is healthier and stronger than he ever has been, and has developed markedly in physical and mental capabilities.

Though I have seen quite a large number of cases of scurvy, and am conversant with about all that has been written on the subject as relating to children, I have failed hitherto to come across a case accompanied by the expulsion of a pseudo-membrane, though I have had cases in which there were bloody evacuations. As we know, in the course of scurvy, we may sometimes meet with extensive ecchymoses, as, for instance, in

the conjunctiva and the so-called scorbutic black eye. It seems to me that in this case which I report there very probably was an ecchymosis in the mucous membrane of the lower portion of the descending colon, and in due time the pseudo-membrane was cast off. Analogy would seem to indicate this to be a plausible explanation of this clinical manifestation. The patient never had an attack of this description before nor since, nor can this attack be considered as an example of that variety of recurring membranous enteritis or colitis which is not infrequently encountered in adults but only exceptionally met with in children.

It has been demonstrated that in adults a neurotic condition, such as hysteria or neurasthenia, predisposes to the development of a membranous enteritis or colitis. I must admit in this connection that my patient was of a neurotic character, but I do not think that the occurrence of the membranous colitis in his case was at all influenced by that factor.

In membranous enteritis or colitis the mucous masses usually present a grayish-white appearance; in my case it will be observed the color was that of clotted blood. This would favor the theory that there had been an ecchymosis present in the mucous membrane of the bowel. Microscopically this mass appeared of a somewhat fibrillary character with blood corpuscles enmeshed in it.

161 WEST FIFTY-SEVENTH STREET.

INFANTILE SCURVY—MILD TYPE.

BY FRANCIS HUBER, M.D.,
New York.

Very little difficulty is experienced in arriving at a diagnosis of infantile scurvy, when petechiæ and hemorrhages have occurred and the gums are affected in a characteristic manner. In cases not so pronounced the absence of voluntary motion in the lower limbs, the fusiform swelling of the long bones, particularly of the femora (due to subperiosteal hemorrhages) and the associated tenderness leave little doubt as to the true nature of the case. In mild types of the disease, unfortunately quite common, none of the usual symptoms are present and the affection is very apt to be overlooked. The swellings are absent, the gums appear natural, the general condition may be excellent and nothing abnormal is found; the child, however, is restless, and cries when moved or taken up. Frequently a general hyperæsthesia appears to exist.

The tenderness, which is so pronounced in advanced cases, is found, but to a lesser extent, in the class now under discussion, principally above the knees, about the ankle, shoulder or hip. This symptom is not constant, sometimes it is fairly well marked and at other times not appreciable. In a recent case observed in a well-nourished child brought up on condensed milk, a trifling swelling over the left ankle and about left hip with great tenderness and inability to move the limbs, disappeared in a few days after the diet was changed to boiled milk and barley water, the juice of an orange being allowed daily. These symptoms had been noticed but four or five days.

A very interesting and instructive case was referred to me some time ago. A child seven months of age, born in the country, was weaned when a few weeks old, the mother not being able to nurse, as she suffered from fissured nipples and subsequent mammary abcesses.

Mellin's Food was first given. A change to malted milk was made when the family moved to the city. Furthermore, the

infant was kept closely confined to the house, not being taken out for fear of catching cold. The combined influence of a want of fresh air and improper food soon manifested itself in a condition of marasmus.

Vomiting and diarrhœa added to the gravity of the case. From the general history scurvy was suspected and a careful examination accordingly made. There was no history of blood in the stools, no evidence of petechiæ or subcutaneous hemorrhages, no fusiform swellings of the bones to be found, nor were the gums in a spongy condition.

Craniotabes, beading of the ribs, and absence of hair in the occipital region, with sweating of the head, pointed to rickets, in an active stage. The examination, as far as scurvy was concerned, was negative. It is true that the lower limbs were slightly rigid, and the movements somewhat restricted; these symptoms were attributed at the time to the lowered vitality of the little patient.

Three-drop doses of the elixir of phosphorous were ordered to be given three times a day and the child was ordered to be taken out. At first one part of milk, one of lime water and four of barley water were advised; four ounces of this mixture to be given every two hours. The quantity of milk was gradually increased, until half milk and half barley water were reached, six ounces given at each feeding. In addition two ounces of beef soup were allowed. Several weeks elapsed before the child was seen again. The general condition had improved, the child gained in flesh and strength. As constipation succeeded the diarrhœa, oatmeal water was used in place of barley to dilute the milk. Also advised daily injection to keep bowels open. In spite of a decided improvement in many respects, the mother stated that the child continued to be restless, appeared to be in pain, and was somewhat tender.

The gums were not swollen or spongy, no petechiæ or fusiform swellings present. Notwithstanding the absence of these symptoms, as the digestion was good and no urinary symptoms present the tenderness and restlessness, in the absence of other causes, were considered to be due to a mild degree of scurvy. The treatment referred to above was continued and the juice of one orange was given daily. Three days later, it was reported that the little one was much quieter and slept undisturbed for several hours at a time. Heretofore after each

feeding, the child still seemed to be hungry; when the orange juice was added to the treatment the little one was satisfied and would rest quietly after the bottle had been emptied. The bowels still somewhat constipated, moved more readily than formerly. The further progress of the case was satisfactory.

A short time ago, in conversation with a friend, a case of rachitic twins a year old was incidentally referred to and an opinion requested. In addition to the breast given for six months they received sterilized milk with varying proportions of rice, barley or oatmeal water, also beef broth or soup. They were taken out frequently. Though fed often and in large amounts they cried incessantly, so that it was necessary now and then to give them small doses of Dover's powder. In reviewing the cases it was found that both the children were rachitic; no hemorrhages, swellings or abnormal conditions of the gum could be discovered. Further careful questioning failed to reveal any intestinal or urinary complication. The crying, tenderness, and restlessness had existed for months. The various features of the case were discussed, and though no swelling or hemorrhages existed, the suggestion was offered that a mild grade of scurvy was present and it would be well to give some fruit juice. A few days later the doctor volunteered the information that the remedy acted like a charm and seemed to be a "specific."

For the first time in months the little ones rested and passed the night comfortably. Though the quantity had not been increased and no other change was made in the diet, except to substitute milk, slightly boiled for sterilized, the children now were quiet after feeding and seemed to be fully satisfied.

Instances might be multiplied. The cases are not common in dispensary practice or among the poor, who allow the children to pick from the table, it is true, to the detriment of the stomach, but they escape scurvy. Among the better classes the disease is frequently met with, the little one receiving the best of care, expensive preparations being allowed, and every article of food is not only cooked, but thoroughly sterilized. This point has been emphasized by a well-known advocate of fresh, raw milk as the best of all foods for the artificial nourishment of infants—provided the milk is procured under such conditions that all danger of contamination is eliminated.

In view of the improvement in these and other instances, it

would appear to be a good plan in cases of artificial feeding to allow a small amount of fresh fruit juices as a routine plan, whenever restlessness and tenderness exist and the little patients do not appear to be satisfied with the bottle.

To recapitulate, the cases thus far studied have occurred in children brought up on condensed milk, artificial foods of various kinds, sterilized milk diluted with water or cereals. The patients without exception, belonged to the better classes and all were rachitic. The prominent symptoms were tenderness, restlessness, and prolonged spells of screaming and crying; no digestive disturbances, vomiting, colicky pains, etc., were noted. Though fed regularly, they never seemed to have enough. The duration of the symptoms varied from a week to several months. In not a single case did hemorrhages occur, and in but one instance were slight swellings observed. Though the two symptoms marked rigidity of the thighs and inability to move the lower extremities, so characteristic of severe cases were absent, the legs were stiff and did not move with the freedom observed in health.

The rapid improvement in the condition of the children, following the application of the therapeutic test, favors the position taken and may be regarded as an additional point in corroboration of the diagnosis of mild infantile scurvy.

209 EAST SEVENTEENTH STREET.

THE USE OF GRUELS AS DILUENTS OF COW'S MILK.

BY HENRY DWIGHT CHAPIN, M.D.,

Professor of Diseases of Children at the New York Post Graduate Medical School and Hospital.

The question as to the best method of acting on the casein of cow's milk in the way of attenuating and modifying the clot has been much discussed. Although it has long been believed that decoctions of the cereals are most efficient for such action, the modifying effect of gruels used in this way has been questioned, so that the writer instituted a series of experiments for the purpose of further studying the problem. He is indebted to Prof. Graham Lusk, for the use of his physiological laboratory and for kind co-operation in the work.

The following three solutions were treated with liquid rennet: (1) Plain cow's milk 50 c.c.; (2) cow's milk 25 c.c., water 25 c.c.; (3) cow's milk 25 c.c., barley-water 25 c.c.

After inverting each tube three times it was warmed to 40° C. on a water bath. Then 3 c.c. liquid rennet was added and each tube again inverted three times. The tubes were allowed to stand for ten minutes at a temperature of 40° C. Each tube was then inverted three times, and the contents were poured into large glass beakers. The following were the results: (1) Solid clot; (2) large, tough clots; (3) smaller, more flocculent clots. After standing until the clots had subsided to the bottom of the beakers, the supernatant fluid in (2) and (3) was carefully decanted to allow a more careful inspection of the clots. A mass of clot from (2) and (3) was next placed in separate test-tubes and well covered with water. Each test-tube was then inverted three times. This agitation caused the clot in (3) to break apart, but that in (2) retained its cohesiveness.

These experiments were repeated several times, with the same results, with one exception. In this case, tough, stringy clots were thrown down by the rennet in the solution of barley-water and milk, and we were at a loss to account for this result so different from all the other experiments. It was finally found that, by mistake, a preparation of barley-water two days old

had been used, instead of a freshly prepared solution. This barley-water was fermenting and very acid. When fresh barley-water was used, the small curds were thrown down as before. This shows the necessity of always using a freshly made gruel as a diluent of cow's milk if a favorable effect upon the curd is to be obtained.

An experiment in digesting clots (2) and (3) was made as follows: Portions of each clot of similar size were placed in beakers and covered with artificial gastric juice. They were then placed in an incubator and kept at the temperature of the body for twelve hours. The contents of beaker (3) were apparently more fluid and changed by digestion than beaker (2).

Experiments were next made with a healthy dog with a gastric fistula that had been produced for the purpose. They were performed on consecutive days, early in the afternoon, the dog having fasted from the previous evening.

(1) 50 c.c. milk and 50 c.c. barley-water were mixed, warmed, and given to the dog by mouth. This solution remained in the stomach for ten minutes, when the fistula was opened and the contents of the stomach were removed, consisting of 85 c. c. of changed milk with the addition of some frothy mucus. The reaction was slightly acid to litmus paper. The stomach was then washed out with distilled water, the water coming away clear. The stomach contents were placed in a glass beaker for inspection. The milk was clotted, with the curds fairly soft and flocculent.

(2) 50 c.c. milk and 50 c.c. water were mixed, warmed, and given to the dog by mouth. At the end of ten minutes the fistula was opened and 90 c.c. of semi-fluid contents were removed. The reaction was slightly acid to litmus paper, but tests showed there was no free acid in the contents removed. The stomach was washed out with distilled water. The stomach contents were placed in a glass beaker for inspection. The clots tend to separate in larger masses than in experiment (1). These experiments were repeated with essentially the same results.

(3) 50 c.c. milk and 50 c.c. barley-water were mixed, warmed and given to the dog by mouth. This solution remained in the stomach half an hour, when the fistula was opened and the contents were removed. The reaction was very acid. The curds were fairly fine and disseminated through the mass, apparently partially digested.

(4) 50 c.c. milk and 50 c.c. water were mixed, warmed, and given to the dog by mouth. The mixture remained in the stomach half an hour, when the fistula was opened and the contents were removed. The reaction was very acid. The curds were larger and collected more in masses than in experiment (3).

The curdling of milk by gastric juice or rennet must not be confused with the precipitation of casein by an acid. Rennet is a clotting enzyme which changes casein into a semi-fibrous mass that has a strong tendency to contract and harden, especially on the outside. Lactic acid accelerates the action of rennet, and the rapidity with which the curds contract and harden depends largely upon the quantity of lactic acid present. Rennet will not coagulate casein in the absence of the salts of lime. Milk that has been dialyzed to remove the salts, or milk that has been boiled or pasteurized will not coagulate well with rennet. After the addition of lime water and a little salt to dialyzed, pasteurized, or boiled milk, rennet acts with great ease. Lime water contains about ten grains Ca ($O H_2$) to the pint, so the beneficial results obtained by adding a small quantity of lime water to milk probably do not come so much from such a feeble effort at neutralizing the acidity of the milk as by allowing the rennet to act to better advantage.

The common objection to the use of gruels as diluents is that the young nursling should not be given starchy food in any form, as its digestive organs cannot cope with this food principle. While large quantities of starch should be withheld in infancy, even the youngest baby can tolerate and digest a small and proper amount. It may be of interest in this connection to glance at one of the more recent analyses of the amount of starch in certain cereals, in comparison with older analyses. Reference is made to a report of the U. S. Department of Agriculture (*Bulletin No. 34*), upon the carbohydrates found in wheat and maize. These cereals are shown to contain a large variety of carbohydrates, among which the following have been quantitatively determined:

	Per cent.
Sucrose	0.02 to 0.70
Invert sugar	None " 0.08
Dextrin	0.3 " 0.40
Starch	30.0 " 42.00
Pentosans and hemicelluloses	4.0 " 5.00
Fibre	2.0 " 2.50

According to the older analyses the cereal grains contain from 70 per cent. upward of carbohydrates, although the foundation for this rests not on specific analytical determination, as in the above analysis, but on estimates "by difference." Thus the newer analysis shows a discrepancy amounting to 20 per cent. or more of the entire material between the actual amounts of carbohydrates found in the materials studied and the amounts indicated in many of the recorded analyses in which the nitrogen-free extract determined "by difference" has been regarded as wholly of carbohydrate matter. This discrepancy introduces not only important errors into the estimation of the nutritive value of foods based on the earlier analyses, but on their digestibility as well. Any disadvantage in the employment of wheat or barley flour from the starch contained in these cereals in very young infants may be easily overcome by dextrinizing the gruels.

Experiments made by the writer also show that dextrinized gruels are more efficient attenuants than plain gruels, the former producing a more spongy curd than can readily be acted on by the gastric juice. Plain gruels and milk, with rennet, form rather gelatinous curds. Upon dropping them into a solution of iodine and iodide of potassium they will at once be colored blue. After washing and breaking the curds it will be seen that the blue color does not extend into the curd, and that there is no yellow coloration, showing that the proteids are not thoroughly exposed. In a gruel of the same strength, if the starch is dextrinized and mixed with milk and rennet, a curd will be formed that falls apart upon slight agitation. Drop some of this curd into the solution of iodine and iodide of potassium and it will be colored yellow, showing a larger surface of proteids exposed. The reason dextrinized gruel has such an effect on the curd is that, as the starch has largely been converted into soluble forms, the gruel is composed, in great extent, of the cell walls of the cereal from which it is made. This cellulose is very flocculent, and when dispersed through the curd tends to prevent contraction; and, as there is little adhesive material present, the curd breaks apart rather easily. This explains why the "flour ball" sometimes gives better results than a plain gruel, as the starch is more soluble than in plain gruels. An easy, rapid and simple method of dextrinizing gruel is by the addition of diastase. Most of the commercial malt extracts are sufficiently active in diastase to

produce the desired effect. The writer, however, prefers the use of diastase itself as being both speedy and efficient. It can either be produced cheaply at home or purchased at the nearest drug store. A simple decoction of diastase may be made as follows: A tablespoonful of malted barley grains, crushed, is put in a cup and enough cold water added to cover it, usually two tablespoonfuls, as the malt quickly absorbs some of the water. This is prepared in the evening and placed in the refrigerator over night. In the morning the water, looking like thin tea, is removed by a spoon or strained off, and is ready for use. About a tablespoonful of this solution can be thus procured and is very active in diastase. It is sufficient to dextrinize a pint of gruel in ten or fifteen minutes. The gruel is made as follows: A tablespoonful of wheat flour or barley flour is beaten up into a thin paste with a little cold water and then stirred in a pint of water, which is boiled for fifteen minutes. When cool enough to be tasted, a tablespoonful of the above solution or a teaspooonful of malt extract or preparation of diastase* is added and the mixture stirred as furthur cooling takes place. The great bulk, if not all of the starch, will be thus dextrinized in about fifteen minutes. The previous boiling is for the purpose of gelatinizing the starch so that the diastase can act to advantage. The gruel is now ready to be used as a diluent of cow's milk, and can be assimilated by the youngest and weakest infant.

51 WEST FIFTY-FIRST STREET.

DISCUSSION.

DR. GRAHAM.—If a child is being fed on the usual milk formula for its age and is developing according to the usual standard, I would like to ask Dr. Chapin when he believes it advisable to begin the administration of gruel.

DR. MORSE.—I wish that Dr. Chapin had given us the analyses of the gruels after they were made rather than the analyses of the grains. I have an analysis of barley water here, and it is fat .05 per cent., proteids .09 per cent., starch 1.63 per cent. and no sugar.

*The following preparations are procurable if one does not care to prepare the diastase: Forbes' diastase, Taka-diastase, Fairchild's pancreatic diastase, and a glycerite of diastase known as Cereo, which is made for dextrinizing gruels.

DR. MILLER.—It seems to me that babies who are brought up on modified milk are sometimes delayed in cutting their teeth. In such instances I have repeatedly substituted a gruel, still maintaining the same proportions of modified milk.

DR. JENNINGS.—During the last year of my service at the Foundling Asylum I experimented with gruels in moderate amount and my observation was that infants that were not doing quite so well as they should, not infrequently began to improve when cereal feeding was adopted. The method I employed was simply the administration of gruels with the other mixture. From clinical observation my experience points to cereal feeding as a useful adjunct.

DR. BLACKADER.—The principal indications that alimentation in an infant is proceeding in a satisfactory manner may be considered to be a weekly gain in weight of at least four ounces to six ounces, freedom from indigestion, and the fact that the infant obtains a sufficient amount of quiet sleep. In some of these respects I think I have occasionally obtained a distinct improvement, by the addition of a moderate quantity of cereal gruel to carefully modified milk. Some years ago I was doubtful that the addition of any gruel could modify the coagulability of milk ; but, for the past two years, clinical evidence has convinced me that some increase of digestibility does take place.

DR. ROTCH.—I would like to ask Dr. Jennings what method of changing the percentages he used.

DR. JENNINGS.—The method was simply that which would be used in the home modification of milk and hence could not be perfectly accurate.

DR. CHAPIN.—I have fed children on laboratory milk, where the percentages were accurate and where there was not the gain that there should be until the addition of cereals was made.

DR. BLACKADER.—In delicate infants in whom artificial feeding has to be commenced shortly after birth, I have occasionally had recourse to Meig's combination of arrowroot and gelatine as a diluent. In older children I sometimes use barley or oatmeal water in the same way. These are added to my milk modifications, at the Walker-Gordon laboratory, in the proportion I may think necessary for each case. For infants under nine months I never use barley or oatmeal as a food, but simply as a diluent.

DR. ROTCH.—It is very important in all these questions of feeding to know what we are using. An analysis was made some years ago by our best chemist in Harvard and it showed that there is very little starch in barley water. As to Dr. Jennings' experiments, you cannot test the value of percentage feeding with home modifications. You can make an approach to it but it is not a fair test.

The writer of the paper some years ago wrote on the question of foreign elements in infants' food, contending that it was well to introduce them. I have always contended that it was not right to introduce elements that do not exist in human milk. At that time the writer of the paper proposed the use of peroxide of hydrogen for preserving milk. You know what the results were. Now I suppose the same sort of a contest is to be fought over these cereals.

This question of cereals has been discussed for a century and some men say that they think it helps the children. I ask, however, for an analysis of what they are using and if it is simply water, or the same as water, why not say so. The more we know of percentage feeding the fewer are the times that we have to put aside the feeding with milk. Human milk is the best food for babies and for ages they have thrived on it better than on anything else. Human milk contains no starch and the less starch you have in your diluent the better for the baby. I believe in following nature as much as possible and you are not doing so when you add these cereals.

DR. BLACKADER.—May I ask Dr. Rotch if he considers that the albuminoids of cow's milk and those of mother's milk are the same except for percentage?

DR. ROTCH.—I do not say so. That has been attributed to me, but I never said it. Our best physiological chemist at Harvard has not been able to answer that question for me, but that is no reason why we should not make use of the percentage method. There is possibly some difference, but as yet we do not know what it is.

DR. BLACKADER.—I fully believe with Dr. Rotch in percentage feeding, but I do think that we can to some slight extent modify the albuminoids of cow's milk by the addition of cereals.

DR. RACHFORD.—During the past three years I have been interested in some experimental work on intestinal digestion. This work has not yet been published, but it is possible that it may have some application to this discussion. In the first place let us note that digestion goes on for the most part in the intestinal canal rather than in the stomach. This may be offered as a criticism to Dr. Chapin's report concerning digestion in the stomach of the dog.

If there is anything established by experimental research it is that the starches when properly prepared are easily digested by almost any juices, whether it be stomach juices, pancreatic juice or even the bile itself. The starch that I used in my experiments was pulverized wheat starch mixed with water in definite percentages. These mixtures were digested very rapidly, so that I got as much as 25 per cent. to 50 per cent. of starch digestion in some of these experiments within thirty

minutes. I think, therefore, it is probable that if starch be mixed with children's foods in a form to be readily digested, such as Dr. Chapin has suggested, that the starch would be very readily changed in the intestinal canal even of the infant.

Another point I want to call attention to, is that starch digestion goes on more rapidly when it takes place in the presence of proteid digestion, or of fat digestion. I was very much impressed with this fact in studying the digestion of various food stuffs. Both albumens and starches are digested by pancreatic juice more rapidly if the digestion of these foods is carried on together. The presence of one of the food stuffs seems to expedite the action of the juices on any one of the other food stuffs.

DR. ROTCH.—The amylolytic function is not developed in the early months of life. It is a well known fact that a function that is being developed should not be taxed. I do not say that a certain amount of starch cannot be digested, but it is not the natural way to develop a human being. We should allow the functions to develop normally and therefore should not add a foreign element to the infant's food. The infant is prepared to take sugar, the adult to take starch and convert it into sugar and it was evidently intended that this conversion should be done for and not by the infant.

DR. GRIFFITH.—I am impressed with the belief that this Society will be better able to discuss this subject ten years hence than it is to-day. Dr. Rotch contends that some use substances that they have not analyzed and then confesses that he uses milk, the proteids of which he does not understand. We have not the knowledge to determine this question on a scientific basis and we must take into consideration clinical experience. I agree with Dr. Rotch that we should try to get a milk as near like the mother's as we can make it, and when I fail with such a modification I do not hesitate to use the addition of some cereals. I agree that barley water is nothing more than water. While taking it the child's stomach is at least getting a rest. I use it with the milk on the plan suggested by Dr. J. Forsyth Meigs. I believe the advancement made in percentage feeding is in the right direction, but until we know more of the chemistry of cow's milk, we cannot do it in every case satisfactorily.

DR. KOPLIK.—I thoroughly agree with the previous speaker and I think it is only fair to say that he should remember, in the first place, that the intestinal waste with cow's milk is sixteen times as great as with mother's milk and, in the second place, to call attention to the work of A. Keller in the Breslau clinic, who has analyzed these foods and then analyzed the feces of the children in the manner hinted at by Dr. Rachford. He has found just what Dr. Rachford stated. He also shows the points that Dr. Chapin has mentioned in regard to diastatic action. It seems to me that this is largely a matter of clinical experience.

DR. CRANDALL.—There are elements to be considered aside from the chemical analysis. Barley water is not simply water. There is certainly a physical difference that must be taken into account as well as the chemical composition. In my own experience it has not always been so difficult to get the food made in proper percentage as it has been to determine what percentage the child needed. That is largely a matter of experience; the more experience one has the more quickly he comes to the determination of the food requisite for such case, and the more satisfactorily he will feed with milk elements alone. I would not say a word against percentage modifications, in which I believe thoroughly. I understand that the point of discussion is not that all children require cereals, but that some children do better when they are used.

DR. FREEMAN.—There has been a great deal said about the improvement of children changed from modified milk to barley and milk, and I think we must bear in mind that many children may be improved by reversing the change again and substituting a simple modified milk for a barley milk. Any change will sometimes do good.

DR. DORNING.—I do not think that any one can gainsay the value of percentage feeding, or the great convenience of the Walker-Gordon laboratory, but I do not believe that any one attains a success of 100 per cent. in feeding with laboratory milk. I do not think that any one claims such a result. We find among adults differences in the digestion and assimilation of food, often the result of some acquired dyscrasia, and why may not the same conditions obtain in the case of infants? We know it to be a fact that all children fed on laborotory milk do not thrive, usually because of imperfect digestion. In a given case percentages of fat and proteids are, from time to time, carefully varied without any noticeable betterment of the infant's condition; we then add a barley or oatmeal gruel to the milk mixture and quickly note an improvement. I have had recently a troublesome case which illustrates this point. The fat was gradually reduced to 1½ per cent. and the proteids to .2 per cent., but the infant did not thrive. Finally, the proteids were increased to .5 per cent., and 40 per cent. of barley water was incorporated with the milk mixture. The digestion improved at once. In a few days the fat was increased to 2.5 per cent. and the proteids to 1 per cent. The digestion then seemed to go on normally, and the baby increased in weight. It seems to me that in this case the barley water had some positive effect; but I would hardly attribute it altogether to the nutritive value of the barley, for I believe much of the result was due to the attenuative properties of the barley water.

DR. FORCHHEIMER.—I want to be put on record as one of those freaks of nature, if you please, that does not use percentage

mixtures or modified milk, because in the first place I believe it is theoretically all wrong, and secondly, because I get along without it. I base these statements upon clinical experience, which I think is of the highest importance. It is a matter of indifference to me what chemists may say, if I can get good results from gruel feeding. My experience of over twenty-two years has verified the fact that I get better results with gruel feeding than without, and under certain circumstances I cannot get along without barley water or oatmeal water. The theorists have made for us a regular bugbear of the carbohydrates, and for years I was held in fear of these things by the experiments of Korownin and Zweifel, and I have done damage to my patients by being placed in that position. On the other hand, we must not err in the other direction. I think that Liebig's food does a certain amount of damage, and all foods made on this basis do harm. But why should we throw away all this clinical experience because in the intestine of the dog or rabbit we find that one food does better or worse?

DR. COTTON.—Do we understand Dr. Forchheimer that his success comes so near 100 per cent. that he does not care to try anything else? It seems to me that if these roads all lead to Rome that must mean something. It means that we are all having trouble, and if Dr. Forchheimer has a perfectly satisfactory method he ought to teach us how to get into such a happy frame of mind. I confess that in Chicago we have not gotten that far.

DR. ROTCH.—I have not spoken of my clinical experience because I do not think that is the proper way to approach such a question. Clinical experience is frequently wrong. One reason why Dr. Forchheimer has not used modified milk is because he has never had an opportunity to do so. There is no laboratory in Cincinnati and his objections are purely theoretical. I do not object to having anything you may wish put into the food but I do wish you to know if possible what you are putting into it. You talk about nutrition being benefited by something that does not exist in the barley water. I have had cases over and over again like those reported by Dr. Dorning, but instead of giving them barley water I used plain water and had the same results. There must be something in the climate of Cincinnati that makes all babies do well upon cereals, for no where else in the world have I heard of such results.

DR. FORCHHEIMER.—I object to being understood as saying that I succeed with all the children that come under my charge. The percentage methods have not been necessary to me because I have had satisfactory results with the methods I have been using in healthy children. I cannot be made to believe that it

makes very much difference whether a child gets 3 per cent. or 3.2 per cent. of fat so long as it thrives.

DR. ROTCH.—It is not small difference of a fraction that I contend for, but the question is, can you arrive at exact results better with empiricism than by exact scientific methods?

DR. CHAPIN.—With reference to my experiments with peroxide of hydrogen, I will remind you that I simply suggested it as a harmless method of preserving milk. After pasteurization was brought out I ceased all efforts in that direction. I am not a physiological chemist, and while not an authority upon the subject I understand the physiological chemists to consider the casein of cow's milk as differing from that of woman's milk; that it is not only different chemically but different physically. As to chemical composition, I am not willing to accept an analysis of a gruel without knowing the percentage of the ingredients and how it was made. I think there is some nutritive value in my gruels. The barley water is best made from barley flour and so far as I know there is but one place in the United States (Akron, Ohio), where they make a barley flour. I will close by simply stating that I believe that by means of dextrinizing the gruels they can be added with advantage.

CEREBRO-SPINAL SYMPTOMS IN INFLUENZA IN INFANCY.

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Epidemic influenza, as observed in infancy and early childhood, apart from the greater danger of cardiac failure, broncho-pneumonia, and gastro-intestinal disturbance incident to early life, usually differs little from the disease as it occurs in older patients. Indeed in some epidemics, notably in that which visited Philadelphia during the past winter, the type of the disease in children has been generally milder than in adults, and many of the uncomplicated cases ran their course in a few days with rapid convalescence and complete recovery. Occasionally, however, in very young children the case may suddenly assume an exceedingly grave aspect from the appearance of distinct cerebro-spinal symptoms, and, despite the most watchful and active treatment, reach a speedily fatal termination through failure of the heart or the respiratory centres. It is to such a class of cases, rather than to those presenting more distinct evidences of true meningitis that the writer desires to call attention.

CASE I.—A marked instance of centric respiratory failure came under observation in the winter of 1897 and was reported in a paper read before the Philadelphia Pediatric Society April 13, 1897, which was published in the ARCHIVES OF PEDIATRICS (October), of the same year. I shall refer to this case in brief abstract. The patient was an infant four weeks old, born at a time when influenza was epidemic, the attack following several characteristic cases in the same household, one of which was in the person of the mother. After a prodromal period of several days characterized by a slight catarrh of the upper air passages and larynx, the cerebral symptoms were ushered in by a slight convulsive seizure with marked failure of respiration, and increasing stupor, with a rather slow but weak pulse and the physical signs of a small area of broncho-pneumonia. For thirty-seven hours this baby remained in an extremely critical condition. At first, tonic laryngeal spasm followed

by a period of apnœa occurred every fifteen to twenty or thirty minutes. In a short time the spasmodic character of the attacks gave place to a slowly increasing weakness and failure of respiration, gradually merging into complete apnœa with increasing cyanosis of the whole surface and rigidity of the limbs. Strong reflex excitation of the surface by flagellation, immersion in hot water, cold affusion, oxygen insufflation, or artificial respiration by the Schultze method, or various combinations of these procedures was successful in averting threatened suffocation many times. Twenty-nine attacks of more or less dangerous apnœa were counted in the first seventeen hours, and fully as many more occurred in the next twenty hours, during all of which time I was compelled to remain in the house within call. In some of these attacks convulsive movements of the eyelids and of the globes were observed, and at one time a marked spinal convulsion with rigidity and opisthotonos occurred. The baby finally recovered after a steadily continued hypodermatic treatment by atropin, tincture of digitalis, and finally antipyrin, together with the internal administration of sedatives —bromides, musk, and asafœtida. A marked alternating internal strabismus was the only evidence of organic disturbance, and this gradually and completely disappeared after several weeks without special treatment. In this case the pathological condition seemed to be best explained by an œdema or congestion at the base of the brain, probably quite limited in extent and involving to some degree also the medulla with the respiratory and pneumogastric centres and the upper spinal meninges. The condition of respiratory failure could be compared most closely with the respiratory paralysis of profound opium narcosis.

CASE II.—A second case, which recently came under observation in consultation with Dr. Maguire, of Lansdowne, while occurring several months after the active period of the epidemic of the past winter, was seen about the same time as several other sporadic cases of distinct influenza, and, for various reasons, to be discussed later, seems to be properly attributable to the same cause.

Margaret W., aged nine months, who had been artificially fed from the end of the first month on milk and one of the more recently introduced patent foods, was first seen on April 24th, about twenty-four hours after the beginning of the acute symptoms of her illness. She had never been a very strong child.

She had always been of constipated habit and, while fairly nourished, was not robust. For several days before she was taken acutely ill her bowel movements had been slightly loose, and were somewhat more frequent than usual, but no other abnormality was noticed. On Sunday, April 23d, she was apathetic and irritable, and in the afternoon it was observed that she looked pale and the eyes were slightly crossed. She vomited shortly after taking her evening bottle, and passed a restless night, vomiting everything taken into the stomach; the bowels became looser. On the morning of the 24th, when I first saw her, she was rather stupid, the pulse was weak, but not more rapid than 120; the rectal temperature was 100°, the respirations 40, catchy and labored in character, with slight moaning. The head was somewhat retracted, the pupils sluggish to light. The lungs showed no distinct changes in as thorough an examination of the chest as I felt justified in making at the time; but the rapid and labored respiration was very suggestive. A provisional diagnosis of meningeal irritation due to toxæmia, probably of pneumonic origin, was given; $\frac{1}{150}$ grain of atropin sulphate hypodermatically was ordered with $\frac{1}{100}$ grain of digitalin, the latter to be given at four to six hour intervals as indicated. Albumen water with peptonoids was given in small quantities and the bowels flushed with normal saline solution. After the washing a considerable quantity of gas of foul odor was passed; slight cough was noted several times. Respiration irregular, but pulse slightly improved.

April 25th.—Head distinctly retracted, with tendency to opisthotonos. Bowels flushed again during the night, a large quantity of foul gas and dark green fecal matter being passed; throat is negative. Morning temperature, 100° in rectum; pulse, 126, weak; respiration, 44; hands and feet cold. Stomach has been quiet since preceding morning. Digitalin continued; coughed once or twice during the night. An area of impaired resonance, with feeble, broncho-vesicular breathing, but without râles, is now noticeable at the right base posteriorly; neck is stiff and head retracted; bowels to be washed with boric acid solution, according to the accumulation of gas.

Evening temperature, $100\frac{1}{5}°$; pulse, 126; respiration, 44. Urine has been passed several times.

April 26th.—Temperature, 99.6°; pulse, 122; respiration, 34. Seems brighter; head moved restlessly from side to side;

less rigidity of the neck. Vomited once the preceding evening and once in the morning, the vomitus containing mucus.

Digitalin in doses of $\frac{1}{200}$ grain to be given hypodermatically every four hours. The spot of congestion at the right base has cleared up, but a similar area is noted at the left base posteriorly. Slight cough persists. Green fecal matter in the bowel washings; flatus collects persistently. Evening temperature, 101⅘°; pulse, 140; respiration, 38-40. Stomach has been retentive all day. About 7.30 P.M. twitching began in the left arm and hand and then rapid movements of pronation and supination of the forearm; similar movements soon began in the right arm and hand, and these continued at intervals through the night. A distinct tache cérébrale can be developed over the abdomen and chest.

April 27th.—About 7 A.M. she was given water in her bottle, but did not notice well, though she swallowed it. Fifteen minutes later convulsive twitching began in the left arm about the elbow, and extended to the hand. The right arm then began to move quickly from supination to pronation and back. The legs were curved inward a little and the feet drawn inward, the great toes being markedly flexed on the soles. The right foot was flushed, the pulse at the wrist not perceptible, according to the nurse's observation; respiration was catchy, sobbing, and irregular. The eyelids twitched, the face became deeply cyanosed and the discoloration spread over the body, the legs as far up as the hips being cold and deeply mottled in a condition resembling *post-mortem* lividity. The neck was quite stiff. The abdomen was greatly distended with gas. The nurse immediately gave a hypodermatic injection of $\frac{1}{100}$ grain digitalin, and half an hour later $\frac{1}{300}$ grain was given on the doctor's arrival.

The child was inverted and in this position the bowels were flushed out with boric acid solution, large quantities of gas being expelled by the bowel. Subsequent discharge of flatus was encouraged by leaving a rectal tube in situ. Hot and cold affusions to the chest, aided by hot sponging of the limbs and a hypodermatic injection of $\frac{1}{1500}$ grain of atropin sulphate, with the digitalin already given, aided in re-establishing after several hours a satisfactory condition of circulation and respiration.

At 1 P.M. the temperature was 103⅘°, respiration deeper, and the pulse improved, 160. The legs were rigidly extended, the left arm and body stiff, but the right arm was raised and

moved about with a slow rotary motion from the elbow. Marked stupor with slight alternating internal strabismus.

Hourly doses of 1 grain of bromide of sodium ordered. Cold to the head and sponging. When disturbed to take medicine both arms are raised and quiver for a time. Continue digitalin $\frac{1}{125}$ grain every fourth hour. Urine is passed more freely. At 4 P.M. the left knee and elbow joints were quite rigid in an extended posture when touched, but both hands are used voluntarily and mental condition is improved.

The evening temperature was 102⅘°; pulse, 145; respiration, 36, irregular. Head was moved voluntarily. Atropin injection repeated. There is a circumscribed flush on the left cheek and the skin of the whole of this side of the head is glossy and warmer than the other side.

April 28th.—During the night the left arm, which had been rigid to handling was relaxed and moved frequently. The right arm was rigid and the hand clenched; the left leg on being disturbed became rigid and the toes tightly flexed on the sole. Neck is again stiff. Pulse improved, 130; respiration, 26, and more regular. Whey and barley water was taken regularly, and she slept fairly for most of the night.

Morning temperature, 102⅘°; pulse, 132; respiration, 26. Considerable gas in bowel relieved by the rectal tube. Left eyelid is purplish in tint. Left leg is still somewhat rigid. Green and brownish feces with mucus from bowel washing. Evening temperature, 104⅘°; pulse, 150; respiration, 45, coming down in a few hours to 101°; pulse, 122; respiration, 28, after a washing of the bowel.

April 29th.—Temperature did not rise above 101°. General condition improved. Is able to move head and limbs, but there seems to be a considerable degree of muscular soreness. Rectal tube produces a brown actively fermenting stool. At the left base there is a distinct area of impaired resonance with harsh broncho-vesicular breathing; $\frac{1}{60}$ grain calomel to be given with food every two hours. Evening temperature, 101⅘°; pulse, 120; respiration, 28. Rested quietly all evening, but the left arm moved restlessly and was frequently raised to the face. Slight rolling of the eyes.

April 30th.—Morning temperature, 100⅘°; pulse, 120; respiration, 28. Goes to sleep with the left arm rigidly extended. Cries when touched. Tongue is frequently protruded. Soon

after mid-day restless tossing of the head which is frequently jerked backward. Face has a swollen, glazed appearance, with dark rings about the eyes. About 3 P.M. increased rigidity, more marked in the left leg than in the right; toes flexed on both feet, the left very tightly; right hand tightly clenched. Color became bad, bluish about the mouth; heart action weak and irregular, respiration faint and irregular. Abdomen is somewhat distended, the extremities cool. Bowels washed with warm boric acid solution, and a large amount of gas and a little feces brought away. Digitalin $\frac{1}{400}$ grain hypodermatically, shortly after which the pulse was 116, much improved in character, and the temperature, 100°.

May 1st.—She had a quiet night. Several stools in the morning from castor oil given the night before. Temperature, 100°; pulse, 118; respiration, 26. Taking nourishment well. Shortly before the morning visit she began rolling the head from side to side and protruding the tongue. Fretting, wakeful, general rigidity very marked. Stares frequently at the ceiling. Bromide of sodium 2 grains every two hours and calomel $\frac{1}{50}$ grain every two hours to be given steadily. Digitalin $\frac{1}{600}$ grain given at noon for weakness of pulse and tendency to cyanosis.

Respirations have been ranging between 26 and 30. Lungs are quite clear. The right hand, which has been tightly closed, is now relaxed, but the legs are still rigid. Head rolling and spasmodic movements of the lips began again in the afternoon. In the evening the convulsive movements of the head and eyes were constant. Flatus relieved by rectal injection containing a little turpentine. Two hours later the abdomen was greatly distended. A large quantity of gas and smooth brownish-green fecal matter was expelled after insertion of the tube. Respiration before this was irregular and shallow, but became fuller after washing the bowel. Temperature, 99⅘°; pulse, 112.

May 2d.—Several times during the night the abdomen became distended and required relief. General rigidity continues. Right hand clenched and quivering. Morning temperature, 99⅘°; pulse, 120. Fretful. During the day a large amount of gas and small quantity of smooth brown fecal matter, less offensive in odor, was passed through the tube. Movements of the head are less violent, but are almost constant while baby is awake; the neck is less stiff; there are frequent involuntary movements

of the left arm. Evening temperature, 99⅘°; pulse, 116; respiration, 22. A better evening, several stools after a laxative.

May 3d.—Had a quiet night. Seems hungry. Gas passed frequently from the bowel without tube. Movements of the head and arm are gradually subsiding.

May 4th.—Toward evening temperature rose to 101⅘°; pulse, 22; respiration, 30, with a little cough. Some dulness at the base of the right lung posteriorly, and during night the temperature reached 102°, with respiration of 44. Restlessness and rigidity increased. By morning of May 5th, temperature had fallen to normal, and so remained. Rigidity of neck is less, but the rest of the body is about the same as before. Uses left hand naturally, but no effort is made to use the right hand, and she does not grasp a toy even when it is placed in this hand.

May 6th.—Restless and fretful; bromide continued. There is still evidence of intestinal fermentation. Bowel washing continued. This evening she made an effort to carry the right hand to the mouth. Hungry and takes an increased amount of food. Temperature, pulse and respiration normal.

May 7th.—A fairly good night. Is quite nervous and easily disturbed; still worried by collection of flatus. The nervous irritability is satisfactorily controlled by drop doses of tincture of hyoscyamus.

May 9th.—Has had frequent crying spells, often moving the head from side to side. Still looks "dazed," according to the nurse. Attempts to use right hand a little, moving the arm from the shoulder, but not at the elbow; bent the left leg voluntarily to-day, but it became rigid if touched.

May 10th.—General condition improving; bowel condition not yet satisfactory, the movements being loose, frothy and sometimes greenish. Light massage of the limbs seems to produce a quieting effect; voluntary efforts are now being made.

May 11th.—Right arm was moved at the elbow for the first time.

May 12th.—She can move the left leg much better, and it can be passively flexed, but there is still tendency to become rigid. Gradually regaining use of the right arm; she is very easily irritated and is disturbed by the presence of others, even the nurse.

May 13th.—Condition of bowel movements improving under use of peptonized milk.

May 16th.—Improving steadily. There is still a tendency to stiffening over the entire body when touched or moved, but this is slowly improving; beginning to hold up head.

May 23d.—Uses both hands and arms well, the right nearly as well as the left; legs are freely kicked about.

The case just described offers several interesting questions for solution. In the first place, the diagnosis of influenzal meningitis, or pseudo-meningitis, may very naturally be called in question, and for a long time I was in doubt whether it should not be more properly regarded as an influenza with a coincident mild cerebro-spinal meningitis of the epidemic type, since it is well known that the two diseases have often been prevalent at the same time, or in close sequence, as has recently been illustrated in Philadelphia.

The physical signs in the lungs were so slight and so characteristic of the peculiar pulmonary lesion of influenza that the existence of an ordinary broncho-pneumonia can scarcely be considered.

The process amounted to nothing more than a passing congestion, which changed its site from day to day, and never reached the grade of a true inflammation of broncho-pneumonic type. From the very start there were distinct evidences of a widespread infection, involving at once the gastro-intestinal tract, the cerebro-spinal meninges and the lung. In conjunction with this must be considered the depressed, comparatively slow action of the heart, and the negative facts of absence of herpetic or petechial eruption and of other symptoms of epidemic cerebro-spinal meningitis, excepting the mild and varying signs of involvement of the cerebro-spinal axis. Taking all these facts into consideration I am constrained to conclude this to be a case of influenza, although it lacks the confirmatory evidence of bacteriological study of the cerebro-spinal fluid, which was not permitted.

The discovery of Pfeiffer's bacillus as the exciting organism of influenza has been of such recent date that the relation of this organism to the complicating lesions of the disease has not been completely worked out. Sufficient has been done, however, to indicate that Pfeiffer's bacillus, under certain conditions, possesses pyogenic properties very much like those of the Eberth bacillus (Finkler, *Twentieth Century Practice*); and it will be found, according to the testimony of Arzée, Huysmann, Maillard

and Revilliod, that the purulent forms of meningitis are the most common. Pfuhl, in 1894, described the *post-mortem* findings in three cases of purulent cerebral meningitis, in which he demonstrated the bacillus, and four years later E. Fraenkel (*Zeitschrift f. Hygiene und Infectionskrankheite*, Bd. 27, H. 3, 1898) reported two cases of cerebral meningitis in infants of ten weeks and nine months, in which the bacillus was found in the purulent exudate.

Besides this form of distinct purulent meningitis, there are other varieties of slighter cerebro-spinal involvement, in which the damage is less severe and from which recovery may frequently take place.

Thus, Hetweg in eleven *post-mortems* found constantly present a very marked hyperemia of the entire central nervous system, such as is otherwise never encountered. The arteries at the base were particularly engorged and the consistence of the cerebro-spinal axis was always increased. He therefore speaks of an influenzal hyperemia, and considers it not of ordinary vaso-motor type, but as a process which is a forerunner of an inflammation.

The two cases reported in this paper seem to correspond to the condition described, especially by French observers, as pseudo-meningitis grippalis, which simulate meningitis in every particular, but either end in recovery or after death, show, at the most, hyperemia of the pia and brain or a permeation of these parts with serum.

Kranhals has observed after the true influenzal period a number of cases which clinically resembled closely an undeveloped cerebro-spinal meningitis, but which presented at autopsy only excessive hyperemia of the pia, without true inflammatory changes and without bacteria. In every case there was pneumonic infiltration of the lower lobes of the lungs. It seems probable that Case II. should be placed in such a class.

I cannot close without referring to the advantages gained in both these cases by the hypodermatic administration of remedies. I am positive that had we not possessed this means of exhibiting digitalin and atropin both in the numerous grave emergencies and as a routine method of stimulation, the doubt as to the etiology in the second case, at least, would have been

quite readily removed by *post-mortem* cultures—a source of intellectual satisfaction that, after all, must give place to the immeasurably greater satisfaction in saving life.

1833 SPRUCE STREET.

DISCUSSION.

DR. WENTWORTH.—It seems to me that this is one of the cases that must be regarded as a lost opportunity and from which we learn nothing. A patient with those symptoms at that age might have had anything, and I do not believe from the symptoms given that it was a case of influenza. A lumbar puncture would have shown whether it was meningitis or not.

DR. CHAPIN.—I cannot agree with the last speaker in regard to lumbar puncture and the probability that it would have settled the diagnosis.

DR. WENTWORTH.—It would have settled whether there was a *meningitis* or not. In a question of this kind experience counts for something. In the last three or four years I have done between 250 and 300 lumbar punctures. Of the cases thus examined about forty of them were cases of epidemic cerebro-spinal meningitis and about fifty were cases of tubercular meningitis. All the work in connection with the punctures and the microscopic and bacteriological examinations were done by me in a systematic manner. It has been my experience that in meningitis, non-tuberculous, if the puncture is done when there are symptoms of active meningitis, one almost never fails to get a positive result, provided the technique has been properly carried out. The technique counts for a great deal, and from what I have been able to read in the literature it has often been very faulty. On the grounds of my experience, I should say that in the vast majority of cases of meningitis, if lumbar puncture is correctly performed when symptoms of active meningitis are present, one will find evidences of meningitis in the fluid. A negative result was obtained in two cases out of all the number of cases of epidemic meningitis which I examined. A negative result may be obtained when the acute symptoms have subsided, and also in chronic cerebro-spinal meningitis if done later.

DR. CHAPIN.—I have performed lumbar puncture about twenty-five times, but have not made the microscopic examination myself, having sent the fluid to a good laboratory, where I suppose all the proper precautions as to technique were ob-

served. In four or five of these cases no organisms were found, while an autopsy showed that they were cases of tuberculous meningitis.

DR. WENTWORTH.—The case reported was not one of tuberculous meningitis, but was supposed to be one of acute infectious meningitis, and I maintain that if it were such a case and puncture had been done during the active stage, the diagnosis could have been made.

DR. WESTCOTT.—I must confess to having felt considerable hesitation in presenting the case as one of influenza. It seemed to me, however, that in the absence of other features the clinical aspect of the case was such as to entitle it to be considered as a case of influenza, especially on account of the coincident involvement of the pulmonary system, the gastro-intestinal system and the cerebro-spinal system. It is possible that the case was, in the first place, one of intestinal infection.

A STUDY OF LESIONS OF THE LIVER IN YOUNG CHILDREN.

BY ROWLAND GODFREY FREEMAN, M.D.,

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(FROM THE DEPARTMENT OF PATHOLOGY OF THE COLLEGE OF PHYSICIANS AND SURGEONS, COLUMBIA UNIVERSITY, NEW YORK.)

I have brought together in this paper certain observations on various lesions of the liver in infants and young children. This has seemed desirable, since the conclusions arrived at are somewhat at variance with the ordinarily accepted ideas. These observations were for the most part made at the New York Foundling Hospital, and on children usually under three years of age. A few on older children were made at St. Mary's Free Hospital for Children.

These observations embraced the following lesions: Descended liver, congested liver, fatty liver, waxy liver, cirrhotic liver, focal necrosis of liver, syphilitic disease of liver, tuberculosis of liver, and suppurative hepatitis. Of these lesions only those presenting interesting features are discussed.

DESCENDED LIVER.

Four cases have recently been examined at autopsy. Three were cases of tuberculosis and one a lobar pneumonia. In three of the cases the liver was enlarged. Two of these enlarged livers and the liver of the fourth case were fatty. In all these cases the liver had slipped down the right side of the abdomen,

from a stretching of the ligament supporting the right lobe, so that what should be the right side of the liver was really in the pelvis, the upper surface proper being directed to the right side and the left lobe being the only part of the liver just beneath the diaphragm. These cases are important only for purposes of differential diagnosis.

FATTY LIVER.

My attention was first called to the practical importance of a recognition of the frequency of the occurrence of fatty liver by a report of a case of persistent large liver in an infant with chronic intestinal disorder in which an exploratory incision was seriously considered, but in which the enlargement gradually subsided with the amelioration of the gastro-intestinal condition.

Infiltration of the liver cells with fat is very common in infants and young children, occurring very much more frequently than in adults. I find that in about 41 per cent. of the autopsies at the Foundling Hospital, the liver is so fatty that its condition is evident on gross examination. Some of these fatty livers are enlarged and some very considerably enlarged, so that the lower border is below the umbilicus. I have never seen an excessively enlarged liver in a child under five years of age that was not due to fatty infiltration.

My own observations are quite at variance with the current views of fatty liver which have found expression in the text-books on diseases of children. They hold that it is found most commonly in certain wasting diseases.

C. Oddo, in *Grancher's Maladie de l'Enfance*, classifies the causes of fatty liver as follows:

1. Intoxications: Phosphorus, alcohol.

2. (*a*) Infections, acute: Typhoid fever, measles, scarlet fever, small-pox and diphtheria, bronchopneumonia, acute general tuberculosis and diarrhea.

(*b*) Infections, chronic: Chronic tuberculosis, hereditary syphilis.

3. Maladies of nutrition: Chronic gastro-enteritis, rachitis.

4. Fatty liver associated with the hepatic lesions.

This classification more nearly indicates the conditions

with which fatty liver is associated than that of any other work.

ANALYSIS OF 496 SUCCESSIVE AUTOPSIES USED TO DETERMINE FREQUENCY OF FATTY LIVER.

In order to obtain a definite knowledge of the frequency of occurrence of fatty livers as found in the autopsies at the New York Foundling Hospital the proportion of cases in which these livers were enlarged and the conditions with which they are usually associated, I have tabulated, with the assistance of Dr. Eli Long, 496 successive autopsies at the Foundling Hospital, omitting only those cases, the records of which were so imperfect as to make them useless for tabulation. The diagnosis of fatty liver was based on the gross examination at the autopsy table.

AGE.—The age was given in 391 of the 496 cases. The average age was about fifteen months. The ages varying from new-born to seven years.

NUTRITION.—1. OF ALL CASES.—Of 455 cases in which the condition of nutrition is stated: 19 were very well nourished; 209, fairly well nourished; 66, poorly nourished; 73, emaciated; 88, markedly emaciated. Thus, 228, or about 50 per cent., were in a satisfactory condition of nutrition; 139, or about 30 per cent., were poorly nourished; 88, or about 20 per cent., were markedly emaciated.

2. OF CASES OF FATTY LIVER.—The nutrition in the cases of fatty liver does not differ materially from the above figures, for in 180 cases where the livers were fatty and the condition of nutrition stated there were 7 very well nourished; 89, fairly well nourished; 27, poorly nourished; 39, emaciated; 18, markedly emaciated. Thus giving 96, or 53 per cent. of cases in a fair condition of nutrition; 66, or 37 per cent. of cases in a poor condition of nutrition; 18, or 10 per cent. of cases in a condition of marked emaciation.

ENLARGEMENT OF THE LIVER.—In these 496 cases, 30 livers were noted as markedly enlarged; 48 as moderately enlarged, and 5 as slightly enlarged, making a total of 83 enlarged, or nearly 17 per cent.

Of these 83 enlarged livers, 64 are noted as fatty, or about 13 per cent. of the 496 cases, or about 77 per cent. of the en-

larged livers were fatty. Of the remaining 19 enlarged livers, 2 are noted as pale; 7, congested; 2, focal necrosis; 2, waxy; 6, negative.

FATTY LIVERS.—Of these 496 cases, in 202, or about 41 per cent., the livers were fatty, that is, showed evidence of fatty infiltration on gross examination; of these, 59, or 12 per cent., were very fatty; 105, or 21 per cent., noted simply as fatty; 38, or 8 per cent., noted as slightly fatty.

With reference to the frequency of fatty livers with different diseases, we find them very commonly in acute infections but rarely in chronic wasting diseases. In marasmus they very rarely occur. In the small number of cases of simple marasmus, six of which I have records, not one shows fatty liver. In simple uncomplicated rachitis again (6 cases) there are no fatty livers; also, 5 cases of syphilis show one moderately fatty liver; also, 2 noted as malnutrition show no fatty livers.

Sixty cases of bronchopneumonia gave 4 very fatty livers; 13, fatty; 4, slightly fatty; total, 21 fatty ones, or 35 per cent., being less than the proportion of fatty livers in all cases. This is perhaps misleading as these are not all cases of acute bronchopneumonia. That is to say, many cases come to autopsy after a short acute illness without definite diagnosis, and the only lesion found is a bronchopneumonia. Such cases would be included in this classification as bronchopneumonias, although death might be due to some other disease without evident lesions.

Six cases of chronic bronchopneumonia showed 3 fatty livers, or 50 per cent.

Thirty cases of bronchopneumonia with colitis gave 4, very fatty; 9, fatty; 1, slightly fatty; total, 14, or about 47 per cent. Eleven cases of bronchopneumonia with rachitis gave 5 fatty livers, or 45 per cent.

In 37 cases of tuberculosis there were 15 fatty livers, or 41 per cent.; just the proportion of fatty livers in the total number of cases.

In the following table these diseases are placed in the order of the frequency with which they are accompanied by fatty livers:

TABLE SHOWING THE RELATIVE OCCURRENCE OF FATTY LIVER WITH DIFFERENT DISEASES.

	NO. OF CASES.	NO. OF FATTY LIVERS.	PER CENT. OF FATTY LIVERS.
Acute Meningitis (non-tuberculous)	13	9	69
Gastro enteritis	56	30	54
Measles	51	27	53
Diphtheria	44	22	50
Bronchopneumonia, Chronic	6	3	50
Bronchopneumonia, with Colitis	30	14	47
Bronchopneumonia, with Rachitis	11	5	45
Whooping-cough	18	8	44
Tuberculosis	37	15	41
Empyema	27	10	37
Bronchopneumonia	60	21	35
Syphilis	5	1	20
Rachitis (uncomplicated)	6	0	0
Marasmus	6	0	0

WAXY LIVER.

Waxy liver is rare in young children, and is, therefore, very infrequently seen at the Foundling Hospital. The two cases in which the writer has found this condition were reported more fully elsewhere.*

One case was in a boy six years old with tuberculous disease of the vertebræ and psoas abscess. Both liver and spleen were enlarged. The urine contained 25 per cent. albumin. Ten days before death ascites and swollen extremities were noticed and the liver extended to the umbilicus.

At the autopsy the liver was found to extend from the fourth rib to the umbilicus and to be hard and waxy. The spleen was also enlarged and waxy. The kidneys were pale and waxy.

* *New York Medical Record.* Vol. 52. 1897. P. 319.

The adrenals were apparently tuberculous. There was a bone abscess involving the vertebræ.

The second case occurred in a girl ten years old, who had suffered from progressive anemia for nearly a year, the hemoglobin having been reduced to 27 per cent. Both liver and spleen were markedly enlarged.

At the autopsy the liver extended from the fourth space

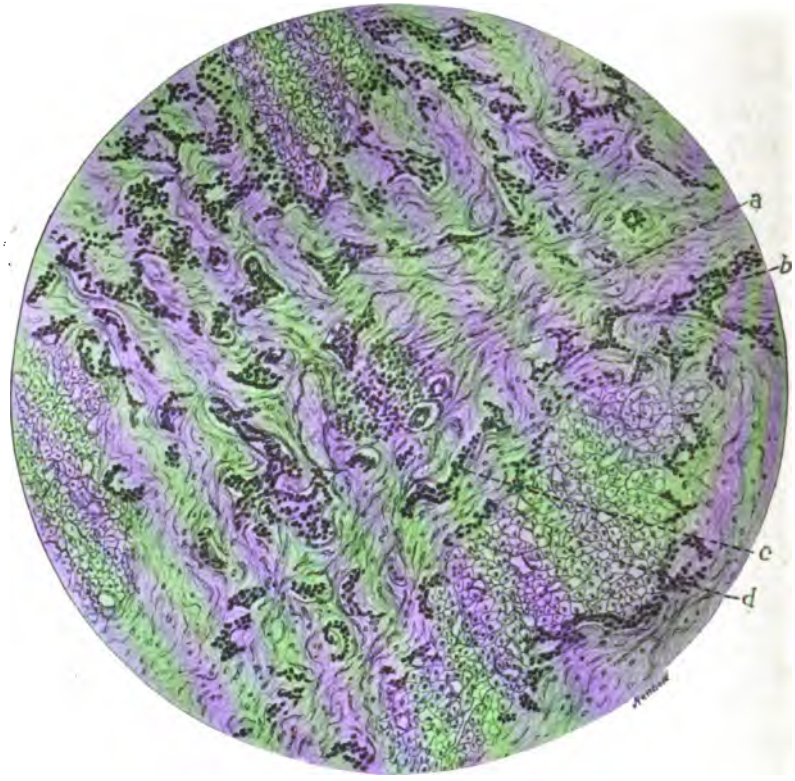

Fig. 1. A SECTION OF CIRRHOTIC LIVER IN A CHILD SHOWING: *a*. Cellular Connective Tissue. *b*. Dense Connective Tissue. *c*. New-formed Bile-ducts. *d*. Liver Parenchyma.

to the level of the umbilicus and was hard and waxy. The spleen reached to a line drawn from the umbilicus to the left anterior superior spine of the ilium. The left kidney was the seat of a very large abscess and the capsule was hard and thick. The right kidney was pale and waxy. The right adrenal was tuberculous as were also two mesenteric lymph nodes.

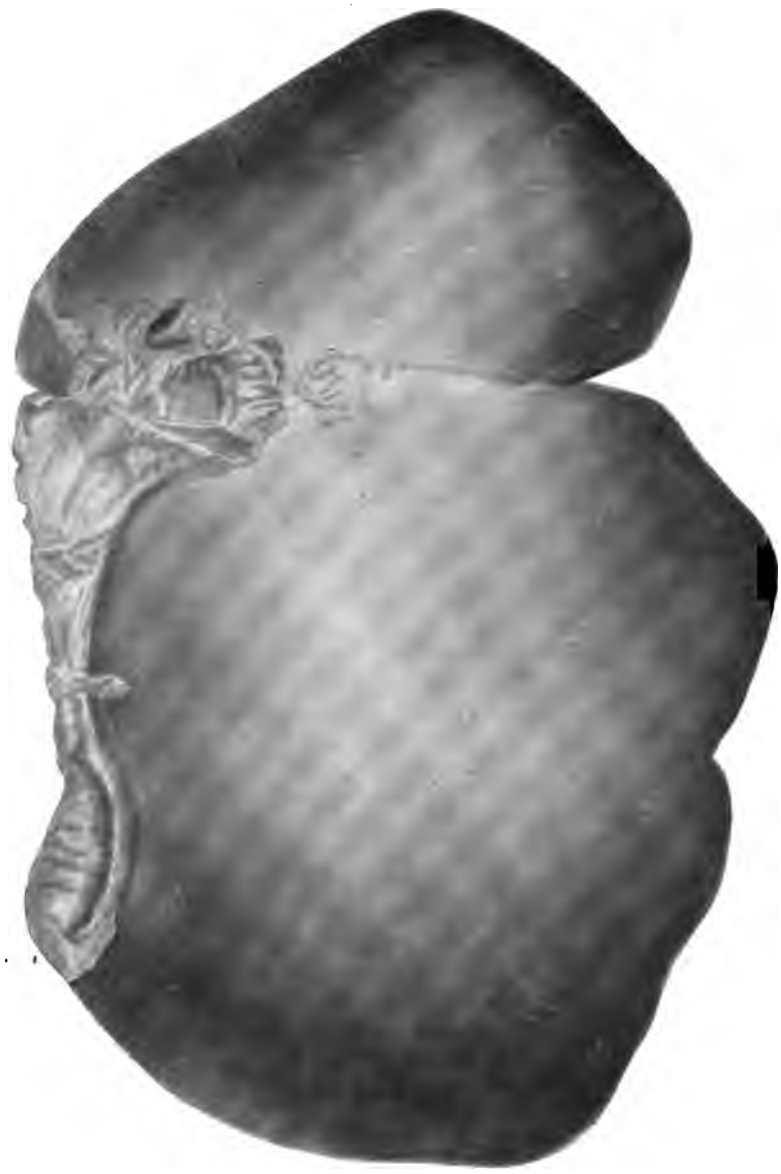

Fig. 2. LIVER OF CHILD SHOWING FOCAL NECROSIS FOLLOWING MEASLES.

Both cases were associated with suppuration. In one of the cases the abscess was tuberculous. In both cases the liver and spleen were very markedly enlarged, while the liver, spleen and kidneys of both cases showed waxy degeneration.

CIRRHOTIC LIVER.

Cirrhosis of the liver occurs occasionally, although rarely, in children. Two marked cases have been examined by the writer, both at St. Mary's Free Hospital for Children, and in successive years. The first has been already reported.* It occurred in a Syrian boy ten years old, who had had measles and whooping-cough some time before. Ten months before admission he had an illness with fever and pain. There was no history of alcoholism. His present illness dated from one month before, edema of the feet, dyspnea and scanty urine having been the first symptoms. On admission there were jaundice, ascites and enlargement of the liver and spleen. Albuminuria occurred a month before death. The blood showed a diminution in hemoglobin and a slight leucocytosis.

The second case was a girl, nine years old, who was said to be in good health until twenty-five days before her death. She gave no alcoholic history, but had had measles and chicken-pox some time before. Nine days after her illness began she was admitted to the hospital suffering from pain in the abdomen and ascites, having been already twice tapped. There was no jaundice.

The liver was not thought to be enlarged. The temperature ranged from 98° to 101° F. On account of doubt as to the cause of the ascites an exploratory laparotomy was done. The liver was felt and seemed rather rough. The child continued to fail and died sixteen days after admission.

Both of these cases thus had a moderately short history, one of three and a half months, the other of not more than a month. Both had marked ascites and emaciation; and one had jaundice, while in neither was there any history of alcoholism or immediately preceding acute disease or of any of the conditions known as frequently associated with cirrhosis.

In both cases the livers showed very similar conditions. They were hob-nailed and very hard on section. The microscopical section in both cases showed an apparently very active

* *New York Medical Record.* Vol. 53. 1898. P. 280.

Fig. 3. SECTION THROUGH LIVER OF CHILD SHOWING FOCAL NECROSIS FOLLOWING MEASLES.

interstitial change going on. There was a very extensive hyperplasia of the interlobular connective tissue, and in this new connective tissue a very marked hyperplasia of the so-called new-formed bile-ducts. This is well shown in the illustration (Fig. 1).

FOCAL NECROSIS.

This condition is due to the local action of bacterial toxins usually at a distance from the seat of the bacterial growth.

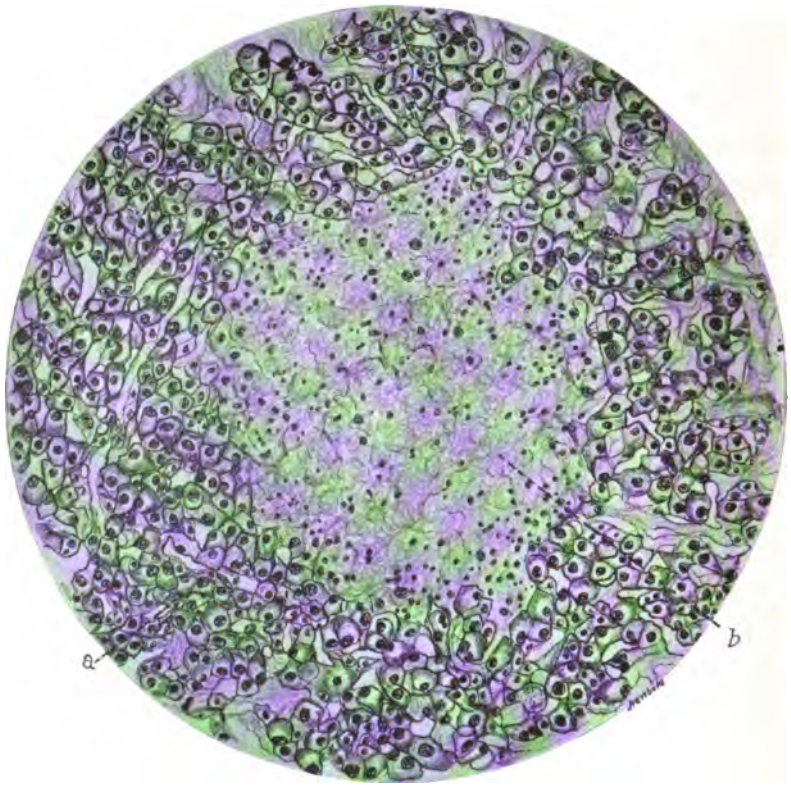

Fig. 4.. AN AREA OF FOCAL NECROSIS IN LIVER OF CHILD FOLLOWING MEASLES. *a*. Liver Parenchyma. *b*. Area of Focal Necrosis.

It has been observed resulting from the toxins of diphtheria, acute lobar pneumonia, malaria, streptococcus infection, and Asiatic cholera. Two toxalbumins of vegetable origin have been found to produce similar lesions. The lesion is not confined to the liver, but involves other organs.

In the liver only the larger areas of focal necrosis are visible

to the naked eye. The appearance of these larger areas is fairly characteristic (Figs. 2 and 3) although they may be mistaken for tubercle. The microscopic lesion, when well marked, consists of a sharply circumscribed, roundish area of necrosis, in which the cytoplasm fails to stain, and there is fragmentation of the nuclei (Fig. 4).

The writer found this lesion of focal necrosis following measles in four cases out of fourteen consecutive autopsies on measles cases. All of these were very carefully examined. In two of the four cases the lesion was evident on gross examination, while in one case only one microscopic area of marked necrosis was found. So far as the author knows this lesion has not previously been described as a lesion of measles. A more complete report of this work has already been made.*

SUMMARY.

1. Descent of the liver down the right side of the abdomen, so that the right lobe reaches below the crest of the ilium, occurs not very rarely in infants, and particularly in those in whom the liver is enlarged.

2. Fatty livers occur very frequently in the infants and children which die at the Foundling Hospital, or in about 41 per cent. of all cases.

3. The condition of nutrition of the child, as expressed by the absence of fat in general and wasting of tissue, apparently has no connection with the fatty condition of the liver, the condition of nutrition in the cases having fatty livers averaging about the same as in the whole number of cases.

4. Fatty livers occur rarely in the following chronic wasting diseases: Marasmus, malnutrition, rachitis and syphilis, unless such condition be complicated by an acute disease.

5. With tuberculosis fatty livers occur not more often than with other conditions.

6. Fatty livers occur most often with the acute infectious diseases and gastro-intestinal disorders.

7. The two cases of cirrhosis of the liver examined by the writer ran a comparatively acute course. The livers on section showed a marked hyperplasia of the so-called new-formed bile-ducts.

8. Focal necrosis of the liver may be a lesion of measles.

* *New York Medical Record.* Vol. 54. 1898. P. 135.

DISCUSSION.

DR. WENTWORTH.—I should like to say a few words about focal necrosis. I believe the work of Flexner on that subject has been proven by Mallory to be incorrect. Mallory demonstrated fully, I think, that the necrosis is produced by proliferation of the endothelial cells lining the lymph spaces. Necrosis results from the mechanical hindrance to the circulation produced by these cells. If I remember rightly, Flexner believed the necrosis was due to the action of toxins on the cells.

DR. KOPLIK.—I think this contribution to necrosis is an important one and a step in advance. In a paper read recently at the New York Academy of Medicine, with accompanying specimens, I believe I said that these areas of focal necrosis were easily mistaken for cirrhosis of the liver. The areas described are not necessarily the beginning of any syphilitic process and we must be careful in making the diagnosis, especially as enlargement of the liver is so very common, as shown in this paper. Very good clinicians are always on the lookout for enlargements due to syphilis and in that respect the paper throws light upon a great many cases that have been considered as beginning cirrhosis.

DR. BLACKADER.—I have listened to this paper with much interest. During the past few years I have met several cases of temporary enlargement of the liver in children. One case I reported three years ago before the Society. Last year I met with another case, in a young girl between nine and ten years of age, suffering from symptoms of general malnutrition, with some gastro-intestinal disturbance. On the fifth or sixth day after I was called in, the liver showed signs of enlargement, and the spleen was palpable. The enlargement increased, until its lower edge was felt below the line of the umbilicus; the blood was carefully examined, with negative results. This enlargement slowly passed away, and at present there is no indication of the trouble. Such enlargement must be somewhat rare, for I have found only indefinite reference to it in the text-books. Probably this fatty condition which Dr. Freeman has spoken of may explain it.

DR. FREEMAN.—The fatty condition of the liver may be due to toxic absorption and in that case one would suppose it would pass away when such absorption should cease.

CONSTITUTION AND BY-LAWS OF THE AMERICAN PEDIATRIC SOCIETY.

ARTICLE I.

Name and Object of the Society.

The Society shall be known as the American Pediatric Society, and shall hold an annual meeting.

It has for its object the advancement of the physiology, pathology, and therapeutics of infancy and childhood.

ARTICLE II.

Proceedings.

The proceedings shall consist of:

1. Discussions on subjects previously selected.
2. Original communications.
3. Demonstrations of gross and microscopic preparations, apparatus, and instruments.

ARTICLE III.

Members.

The Society shall be composed of two classes of members to be designated (1) active members and (2) honorary members.

The number of active members shall be limited to sixty.

The number of honorary members shall be limited to twenty-five.

NOTE.—Amendments having been made to the constitution from year to year, the original constitution as last published failed to represent the instrument in actual force. At the annual meeting of 1899, therefore, a committee was appointed, consisting of the secretary and recorder, with instructions to collect the various amendments and to republish the constitution as thus amended. The committee was empowered to make such verbal changes as might be necessary to render the various sections consistent and intelligible. The constitution as here published, therefore, is that now in actual force by vote of the Society.

ARTICLE IV.

Election of Active Members.

Nominations to membership, signed by two members of the Society, must be made in writing at least one meeting prior to their election.

Nominations should be made to the secretary, whose duty it shall be to require the nominators to write a personal letter endorsing and stating the qualifications of the nominee, and at the same time furnishing to the secretary a list of the nominee's professional positions and publications, with reprints of the latter, when obtainable.

It shall be the further duty of the secretary to transmit to the chairman of the council all the above papers pertaining to each nominee, at least three months prior to his possible election.

The chairman of the council shall transmit the above named papers to the other members of the council in the order of their seniority as council members, the junior member of the council returning them to the secretary.

It shall also be the duty of the secretary to furnish a printed list of all nominees at least once a year to every member of the Society, and it shall be the duty of the members of the Society, without solicitation, to furnish the council with any information that they may possess as to the fitness of the nominees to become members of the Society.

ARTICLE V.

Election of Honorary Members.

Physicians of sufficient eminence to merit the distinction may be elected honorary members, to a number not exceeding twenty-five. Such members shall be entitled to attend all meetings and take part in the proceedings, but cannot vote.

ARTICLE VI.

Initiation Fee and Annual Dues.

Membership shall be completed by the payment of an initiation fee of ten dollars.

Each member shall pay an annual fee, the amount of which shall be decided at each annual meeting.

Honorary members shall be exempt from fees.

ARTICLE VII.

Officers.

The officers shall consist of a president, two vice-presidents, a secretary, a recorder and editor, a treasurer—all to be elected annually—and a council.

ARTICLE VIII.

Duties of Officers.

The duties of the president, vice-presidents, secretary, and treasurer shall be those usual to these officers. The recorder and editor shall secure the papers read and see that proper notes are taken of the discussion thereon for the use of the committee on publication.

ARTICLE IX.

The Council.

The council shall consist of seven members, who shall be chosen at the first meeting by ballot. One, selected by lot, shall retire at the end of the first year, and shall not be immediately eligible to re-election; another similarily selected, shall retire at the end of each year until all of those originally chosen shall have retired, after which one shall retire each year in the order of election, and his place be supplied by another.

ARTICLE X.

Duties of Council.

It shall be the duty of the council to suggest the subjects for discussion, to consider the nominations for membership, and to report on them at the meeting at which they shall be balloted on. The council shall also be a committee on nominations to

office, and as such shall present a report at the business meeting, at the conclusion of which the election shall be held by ballot.

It shall appoint a business committee of three, who shall with the president and secretary, make all the arrangements for the meetings, including the preparation of a programme.

ARTICLE XI.

Publication Committee.

The secretary, treasurer, and recorder shall constitute a committee on publication, to which shall be referred all papers, reports and other matters intended for publication.

All papers presented shall become the property of the Society.

ARTICLE XII.

Amendment of Constitution and By-Laws.

Proposals for amendments of the constitution and by-laws must have been made at the meeting previous to that at which they are voted on, the notice for which shall contain an announcement of the proposed changes. Such changes shall require, for their adoption, an affirmative vote of three-fourths of the active members present.

ARTICLE XIII.

Expulsion of Members.

A member may be expelled from the Society for conduct unbecoming a physician and a gentleman. In such cases, formal charges must be made by two members, which shall be referred to the council.

Membership shall lapse because of absence from three consecutive meetings, without reason acceptable to the council; or for non-payment of dues for one year, two notifications having been given.

ARTICLE XIV.

Quorum.

Any number of members present at the appointed time of the annual meeting, shall constitute a quorum for the transaction of business, but for the election of members, fifteen shall be necessary for a quorum; and for the expulsion of members, or for altering the constitution and by-laws, twenty-five members shall be necessary.

ARTICLE XV.

Order of Business.

1. The president shall call the meeting to order and open the session by an address. In his absence one of the vice-presidents shall preside, and in the absence of all these officers, the chairman of the council.

2. When a general discussion is arranged by the council, the two members appointed to open the discussion shall not occupy more than twenty minutes each; subsequent speakers shall be restricted to ten minutes each.

3. Voluntary papers shall not exceed twenty minutes in the reading. In the discussion following the reading of such papers, remarks shall be limited to ten minutes. Should any paper be too long to be read in twenty minutes, the writer must prepare an extract which can be read within that time.

4. At the business session the report of the council as a committee on nominations to office and to membership, shall be made, and ballot shall be held thereon.

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